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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, One dollar.

Life membership, Fifteen dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to *A. B. Weimer*, Chairman Membership Committee, 512 Walnut Street, Phila.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

WE publish in this issue a bill which has been presented for action to the Legislature of Pennsylvania now in session, entitled "An Act to establish a Department of Forestry, to provide for its proper administration, to regulate the acquisition of land for the Commonwealth, and to provide for the control, protection and maintenance of Forest Reservations by the Department of Forestry."

This bill is known on the file of the House of Representatives as Bill No. 24.

We trust that the act will be carefully perused by each reader of FOREST LEAVES, and that he or she will use such influence as is available to carry forward the measure.

A draft of the bill was read to the Council of the Pennsylvania Forestry Association, and the provisions approved. As we understand the bill, it is practically an enlargement of the powers of the Forestry Commission as now organized, giving to those who constitute the Forestry Reservation Commission a fixed tenure of office and compensation for necessary expenses.

The bill constitutes a Department of Forestry, the position of Forestry Commissioner being continued, and the Forestry Reservation Commission are given power to purchase lands for forest preservation, and to manage and control these and other lands owned by the State.

Forestry is deemed of sufficient importance to be recognized as entitled to rank as a Department, and not as a bureau, in the State government.

An effort has been made to avoid the absolute interdiction of cutting timber from, or the sale of, forest lands, which has brought into question the reservation laws of other States, but the phraseology of the law as presented is evidently intended to have the purpose of the Commission understood as being for the protection and preservation of ex-

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isting forest lands, and the propagation of the new forests within the bounds of the State. A statement favoring the passage of the bill referred to and explaining it more in detail follows.

We also give the text of an amendment to the Act for encouragement of forest culture and providing penalties for the injury and destruction of forests, passed June 1, 1887, which fixes the time for estimating the reduction of taxes from the date that the land was cleared. J. B.

* * * * *

We are gratified to present to the readers of FOREST LEAVES that portion of the text of the message of Governor Stone to the Pennsylvania Legislature which treats of the forestry problem, for it is another assurance that the Chief Executive of this Commonwealth appreciates the importance of the movement in which we are engaged.

We recognize the important aid to forestry which the co-operation of the various Governors has rendered. Ex-Governors Pattison, Beaver and Hastings gave valuable assistance by publicly expressing appreciation of the importance of preserving our forests, and each approved legislation looking to this result. Governor Stone goes further, and, as will be seen from the excerpt given in these columns, recommends creating a Department of Forestry as a feature of State administration.

Such a Department would be of decided advantage to the State if it is not permitted in the future to be drawn into the whirlpool of politics. A commission of able men embodied with a patriotic purpose to advance the State by conserving in a business manner existing forests and reforesting waste lands, can make a department such as is recommended by Governor Stone a power for good, and it is to be presumed that the views of the Governor are to make more useful the work of the efficient Commission now acting. J. B.

—Mr. Jacob W. Manning, of Reading, Mass., states that in an experience covering over forty years he has found that the proper time to plant deciduous as well as evergreen trees in the spring is to commence promptly after the frost is out of the ground; all the planting done before the heavy spring rains are over, if done with discretion, is much surer of success than later planting, when the soil is dry. With care, coniferous trees may be planted as late as June. The larch tree, however, is only successful when planted late in the fall or early in the spring. He has found it a good practice to dig large holes, and leave them open all winter for spring planting.

Why House Bill No. 24 Should Become a Law.

THE Act of May 25, 1897, "To secure State Forestry Reservations and providing for the expenses thereof," has done its work in creating and maturing public sentiment upon the vital importance of State ownership and protection of our waste lands. The people have, with a singular unanimity, approved of the work already accomplished by the Forestry Commission, and urgently demand decided advances in the same direction. The bill provided that the land so acquired should be placed under the care of the Department of Agriculture.

Two things have become apparent, namely: that the one hundred and twenty thousand acres provided for in the original bill are entirely inadequate for the purposes of State Forestry Reservations, and that there is a growing demand all over the State that this acreage be increased, and that additional reservations be created in portions of the State other than those specified in the Act of 1897; and, in the second place, that to properly manage the land acquired, and that which is in prospect, so as to restore it to a productive condition, it is necessary that all the public land interests of the State should be included in one department, and that this department should be separate and distinct from all others. When this is accomplished, and not before, it will be possible to develop and maintain a settled forest policy for Pennsylvania.

"An Act to establish a Department of Forestry, to provide for its proper administration, to regulate the acquisition of lands for the Commonwealth, and to provide for the control, protection and maintenance of Forestry Reservations by the Department of Forestry," has been carefully prepared and already passed its first reading in the House of Representatives, and is entered upon the calendar as House Bill No. 24.

Besides creating the Department, this measure provides for a State Forestry Reservation Commission, of which the Commissioner of Forestry already appointed shall be President. It also gives the said Commission full power, by and with the consent of the Governor, to purchase suitable lands in any part of the Commonwealth that the State should possess for Forest Reservations, and places the care of the lands so acquired in the hands of the Commission, to protect and to manage in accordance with such rules as experience of other States and other countries has shown to be productive of the best results.

It also provides that the Commissioner of Forestry shall be the Executive Officer of the Forestry Reservation Commission and Superintendent of the State lands.

It provides also for the maintenance of public roads which may run through the State lands, by the State, and directs that the Forestry Reservation Commission shall have an office at the State capital.

Looking to the future, this bill also provides for the maintenance of the State Reservations by the sale of timber or minerals which may be found within the limits of the reservations, when it is in the interests of the reservations themselves and the State that this shall be done.

It is safe to say that no more comprehensive forestry bill has ever been drawn in this country, and that no other bill of similar character has ever been more carefully considered in all its provisions.

If it becomes a law, it will forever establish the forestry interests of Pennsylvania, and place this Commonwealth, so far as legislation is concerned, in advance of any State in the Union.

The Council of the Pennsylvania Forestry Association is so fully impressed with the merits of this bill that it has given its endorsement to the measure, and FOREST LEAVES asks each Pennsylvania reader to at once request of his or her Representatives in the General Assembly at Harrisburg to give this measure a full, careful and impartial consideration, and if he can conscientiously do so, to use all proper means to secure its enactment into a law.

—Brunswick, Maine, a place of about 7000 inhabitants, is probably the first municipality in the United States to undertake forest-planting on a large scale, or what is practically the Old World institution of a town forest. The town owns a tract of about 100 acres of what was once pine land, but long since given over to fire and huckleberries. At a recent meeting of the council $100 was appropriated to improve this land by planting it to white pine. Seed will be purchased and a nursery established to raise the young trees. At the right age they will be transplanted in rows and set out in the positions they will finally occupy, and will then require little more care, except protection from fire.

The land at present is absolutely unproductive. If the new plan is successful it will not only be ornamental but profitable. Town forests are common in Europe, and often furnish a large part of the municipal revenue.

The planting will be under the direct supervision of Austin Cary, but the Division of Forestry will assist in organizing and carrying out the work.

Proposed Forestry Legislation.

THE following is the text of the proposed Act to create a Department of Forestry, being No. 24 on the file in the House of Representatives. It is endorsed by the Council of the Pennsylvania Forestry Association and has passed second reading:

AN ACT

To establish a Department of Forestry, to provide for its proper administration, to regulate the acquisition of land for the Commonwealth, and to provide for the control, protection and maintenance of Forestry Reservations by the Department of Forestry.

SECTION 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That there be and is hereby established a Department of Forestry, to consist of the Commissioner of Forestry and four other citizens of the Commonwealth, who together shall constitute the State Forestry Reservation Commission, and each of whom shall be appointed and commissioned by the Governor, by and with the advice and consent of the Senate, for a term of four years,—two of said citizens for a term of two years, and two of said citizens for a term of four years; and thereafter all appointments shall be made by the Governor by and with the advice and consent of the Senate for a term of four years. The persons so appointed, before entering upon the discharge of their duties, shall each take and subscribe to the oath of office prescribed by Article seven of the Constitution of Pennsylvania. The Commissioner of Forestry and the Forestry Reservation Commisson so appointed shall be clothed with all the powers heretofore conferred by law respectively upon the Commissioner of Forestry and the Forestry Reservation Commission, so far as the same are consistent with the provisions of this Act, and in addition shall have full power, by and with the consent of the Governor, to purchase any suitable land in any county of the Commonwealth that in the judgment of said Commission the State should possess for forest preservation. Said Commission shall also have full power to manage and control all the lands which it may purchase under the provisions of this Act, as well as those that have heretofore been purchased, and which are now owned by the State under existing laws. Said Commission is also empowered to establish such rules and regulations with reference to control, management and protection of forestry reservations, and all

lands that may be acquired under the provisions of this Act, as in its judgment will conserve the interests of the Commonwealth; and wherever it shall appear that the welfare of the Commonwealth, with reference to reforestation and the betterment of State reservations, will be advanced by selling or disposing of any of the timber on forestry lands, the Commission is hereby empowered to sell such timber on terms most advantageous to the State; and said Commission is hereby empowered to make and execute contracts or leases in the name of the Commonwealth for the mining or removal of any valuable minerals that may be found in said forestry reservations, whenever it shall appear to the satisfaction of the Commission that it would be for the best interests of the State to make such disposition of said minerals, and provided that such contracts or leases shall also be approved by the Governor of the Commonwealth.

SEC. 2. Any person or persons who shall kindle fires upon any of the forestry reservations of this Commonwealth, except in accordance with such rules and regulations as may be prescribed by the Forestry Reservation Commission, or who shall cut or remove any timber whatever, or who shall do or cause to be done any act that will damage forest lands or timber belonging to this Commonwealth, shall be guilty of a misdemeanor, and upon conviction thereof be subject to a penalty of not less than one hundred dollars nor more than five hundred dollars for each offence committed, with costs of suit, which penalty and costs of suit shall be collected in the same manner as is now provided by existing laws for like offences committed on forest lands belonging to individuals; all fines and penalties, when collected, to be paid to the Commissioner of Forestry, who is hereby directed to pay the same over to the State Treasury: Provided that if the defendant or defendants neglect or refuse to pay at once the penalty and costs imposed, he or they shall be committed to the common jail of the county wherein the offence was committed until such penalty and costs are paid.

SEC. 3. That the Commissioner of Forestry shall be the President and Executive Officer of the Forestry Reservation Commission, and also Superintendent of the State Forestry Reservations, and shall have immediate control and management, under the direction of the Forestry Reservation Commission, of all forest lands already acquired, or which may hereafter be acquired by the Commonwealth; but the power so conferred upon said Commissioner of Forestry shall not extend to the enforcement of the laws relating to public health or the protection of fish and game. It shall be the duty of the Commissioner of Forestry to encourage and promote the development of forestry, and to obtain and publish information respecting the extent and condition of forest lands in the State, and to execute all rules and regulations adopted by the Forestry Reservation Commission for the enforcement of all laws designed for the protection of forests from fire and depredation; and he is hereby empowered to employ such detective service and such legal or other services as may be necessary for the protection of the forestry reservations owned by the Commonwealth, and for the apprehension and punishment of persons who may violate any of the forestry reservation laws or any of the rules and regulations which, under the powers herein given, may be adopted by the Forestry Reservation Commission: Provided that the services so employed and the expenses that may thereby be incurred shall be approved by said Forestry Reservation Commission and the Governor of the Commonwealth.

SEC. 4. The Commissioner of Forestry shall receive a salary of three thousand dollars per annum, and in addition thereto shall be reimbursed for all necessary expenses of travel which may be incurred in the discharge of the duties of his office, and the other members of the Forestry Reservation Commission shall serve without salary, but shall be reimbursed for all necessary expenses incurred by them in the performance of their duties.

SEC. 5. The Commissioner of Forestry shall have an office at the State capital, and it shall be the duty of the Board of Commissioners of Public Grounds and Buildings to provide from time to time the necessary rooms, furniture, apparatus and supplies for the use of the Department of Forestry created under the provisions of this Act.

SEC. 6. All moneys appropriated by the General Assembly in the general appropriation act of 1899 for the Division of Forestry of the State Department of Agriculture, as for salaries and contingent fund, which may remain unexpended at the time of the approval of this Act, shall be transferred to and vested in the Department of Forestry hereby created, and the clerk of the Commissioner of Forestry hitherto appointed under the law creating the Department of Agriculture shall be transferred from the Department of Agriculture to the Department of Forestry on the same salary that he now receives.

SEC. 7. The purchase money for lands acquired, and all expenses that may be incurred, except the salaries of the Commissioner of Forestry and his clerk, shall be paid by the State Treasurer out of any moneys in the Treasury not otherwise appropriated, on warrant of the Auditor General, upon vouchers duly approved by resolution of the Forestry Reservation Commission and the Governor of the Commonwealth.

SEC. 8. The title of all lands acquired by the Commonwealth for forestry reservations shall be taken in the name of the Commonwealth, and shall be held by the Commissioner of Forestry, and such lands shall not be subject to warrant, survey or patent under the laws of the Commonwealth authorizing the conveyance of vacant or unappropriated lands; and all such forestry reservation lands shall be exempt from taxation from the time of their acquisition. In all cases where lands have been purchased, or may hereafter be purchased, by the Forestry Reservation Commission for forest reservations where there are public roads regularly established running into or through said lands, the Commissioner of Forestry, under such rules and regulations as the Forestry Reservation Commission is hereby authorized to adopt, may expend a sum not exceeding twenty-five dollars per mile in each year for the maintenance, repair or extension of any such roads, and on roads bordering on reservations one-half of this rate per mile may be expended. All expenses that may thus be incurred shall be subject to the approval of the Forestry Reservation Commission and the Governor of the Commonwealth, and shall be paid in the same manner as other expenses are provided for in this Act.

SEC. 9. The Commissioner of Forestry shall receive the moneys to which the State may be entitled by virtue of the sale of any timber, or by virtue of any leases or contracts relating to the disposition of minerals, as hereinbefore provided, and he shall immediately pay the same over to the State Treasurer as a part of the revenue of the Commonwealth. The said Commissioner of Forestry shall give his bond to the Commonwealth, with two sureties, to be approved by the Governor, in the sum of ten thousand dollars for the faithful discharge of the duties imposed by this Act, and for the proper accounting of any moneys to the Commonwealth that may come into his hands by virtue of his position as Commissioner of Forestry.

SEC. 10. That all Acts or parts of Acts inconsistent with the provisions of this Act be and the same are hereby repealed.

The following bill finally passed the Senate on January 30, 1901, and is commendable in rebating taxes on lands which are being reforested:

File of the Senate, No. 20:

AN ACT

Amending Section 2 of an act entitled "An Act for the Encouragement of Forest Culture and Providing Penalties for the Injury and Destruction of Forests," approved June 1, 1887, amending and extending the provisions thereof.

SECTION 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That Section 2 of an act entitled "An Act for the Encouragement of Forest Culture and Providing Penalties for the Injury and Destruction of Forests," approved June 1, 1887, which reads as follows:

"The owner or owners of forest or timber land in this Commonwealth which has been cleared of merchantable timber who shall within one year after the said land has been so cleared have given notice to the Commissioners of their respective counties that the said land is to be maintained in timber, and who shall maintain upon the said land young forest or timber trees in sound condition in number at least twelve hundred to the acre, shall, on making due proof thereof, be entitled to receive annually from the Commissioners of their respective counties the sum of money mentioned in the first section of this Act; *Provided*, That the first period of ten years shall be counted from the time that the said land has been cleared of merchantable timber, and that after the said first period of ten years the number of trees upon the said land may be reduced as in the first section is provided," shall be amended so as to read as follows:

"The owner or owners of forest or timber land in this Commonwealth which has been cleared of merchantable timber who shall at any period after the said land has been so cleared, and who shall maintain upon the said land young forest or timber trees in sound condition in number at least twelve hundred to the acre, shall, on making due proof thereof, be entitled to receive annually from the Commissioners of their respective counties the sum of money mentioned in the first section of this Act; *Provided*, That the first period of ten years shall be counted from the time that said land has been cleared of merchantable timber, and that after the said first period of ten years the number of trees upon the said land may be reduced as in the first section is provided."

SEC. 2. That all acts and parts of acts inconsistent herewith be and the same are hereby repealed.

On the property of the Marquis of Lansdowne at Meiklour, Perthshire, Scotland, is a celebrated beech hedge over 100 feet high, which is said to have been planted in 1745 by a party of Highlanders, who camped there while on their way to join the Pretender Prince Charlie.

Pennsylvania's Forest Reservations.

IN his message to the Legislature of 1901, Governor William A. Stone takes strong ground in regard to our forest reservations, and we take pleasure in quoting this portion of the message :

The act approved March 13, 1895, establishing a Department of Agriculture, directs the Secretary of Agriculture to obtain and publish information respecting the extent and condition of forest lands in this State; to make and carry out rules and regulations for the enforcement of all laws designed to protect forests from fires.

The act approved March 30, 1897, authorized the purchase of unseated lands for the non-payment of taxes for the purpose of creating a State Forest Reservation. Under this act the Commissioner of Forestry was required to purchase lands at treasurers' sales for the non-payment of taxes. The Legislature of 1897 also passed an act, approved May 25, 1897, to secure State Forestry Reservations, which authorized the appointment of a Commission composed of the Commissioner of Forestry, the Chairman of the State Board of Health, the Deputy Secretary of Internal Affairs and two other persons. This Commission was authorized to create Forestry Reservations in continuous areas, as far as practicable, by the purchase of unseated lands. The Legislature of 1899, also, by act approved April 28, 1899, amended the act of March 30, 1897, providing that the Commissioner of Forestry shall have the power to purchase unseated lands other than such as are advertised for sale for the non-payment of taxes, upon such terms and conditions as may be agreed upon with the owners of such land; provided that the amount paid for any tract of land should not exceed the sum of $5 per acre, and provided that the purchase should be approved by the Governor and the Board of Property, consisting of the Attorney General, the Secretary of the Commonwealth and the Secretary of Internal Affairs.

Under these various acts of Assembly the State has acquired considerable bodies of land in Elk, Lycoming, Clearfield, Clinton, Centre and Pike counties, amounting in the aggregate to this date to 97,962 acres and 20 perches. The purchase of various other tracts has been authorized, which, if the titles prove satisfactory, will increase the acreage owned by the State to something over 113,000 acres. The cost to the State of the 97,962 acres and 20 perches already acquired is at an average of about $1.35 per acre. Some of this land has increased in value since its purchase by the State, and could now be sold at an advance.

The purpose of acquiring these lands is to preserve and increase our forests. Forests exert a great influence on the streams and climate, and tend to preserve the health of the community. Their rehabilitation in Pennsylvania if only to part of their former extent will be productive of the greatest good. It is the purpose of the present Administration to purchase more lands in various sections of the State under the several acts of Assembly wherever they can be purchased cheaply. The investment is a good one, and should the State acquire a large acreage of wild lands it cannot under any circumstances be a mistake. The land will increase in value through the rapid growth of timber, and, while there will be destruction in part by fire, yet the average value will largely increase. These public lands will become the people's parks, open to them at all times for hunting, fishing and camping, and the people in turn will become the guardians and protectors of the forests. Already they are quite popular in the vicinities where purchases have been made.

There should be additional legislation relating to the forest reservations. As the purchase of large tracts in any one county withdraws those lands from taxation it is thought that separate tracts scattered about over the State in various places would be productive of better results. Too large bodies of land should not be purchased in one county to the exclusion of others. If the purchases were distributed more evenly over those counties where forest lands still exist the reduction of local taxation by such purchases would be trivial.

In a very few years the State will receive a large revenue from the sale of matured timber that has been destroyed by insects, fire and wind storm. So far the deeds have been made to the Commonwealth of Pennsylvania, but in case it became desirable to sell timber that had been destroyed by fire or wind storm the power under the present laws is deficient. There are practically three separate bodies or departments that have supervision over these forest lands—the Agricultural Department, the Board of Property and the Forestry Commission. All these bodies give occasion for conflict, although fortunately none has yet occurred.

I would respectfully recommend the passage of an act of Assembly that would place the purchase and supervision of these lands under one management, and authorize that management to sell mature timber and timber destroyed by fire, wind storm and insects; to lease coal and oil rights on royalty, and pay the proceeds into the Treasury of the Commonwealth, and that more stringent laws should be passed for the protection of these forests from fire. The management should also have the power, under certain circumstances, to appoint forest wardens with limited compensation, and authority should be given for the purchase of lands under a limited price wherever in the judgment of the management it would be best for forest reservation so to do. All taxation, local and for all other purposes, should cease upon these lands the moment the title vests in the State.

The Walking Stick.

MY attention was called last Fall to the fact that the forest trees on the mountains and hilltops near Millville, ten miles north of Bloomsburg, were being defoliated by vast hordes of the orthopterous insect known commonly as the Walking Stick, and among scientists as *Diapheromera femorata* of the family *Phasmidae*, and I immediately resolved to visit the section at my first opportunity.

The ride through Little Fishing Creek Valley to Millville is always charming. The hillsides are clothed with dense thicket and forest growth. In spite of the havoc played with the foliage by the tent-caterpillar in the early spring, and the succession of short but acute drouths during the summer, the trees and shrubbery were in unusually fine condition.

As we turn into Lick Run Valley a short distance above Iola, a glance at the hilltops reveals to us the scene of the battle that has waged for several weeks between the forces of plant and animal life. Looking up from the valley to the hilltops, the spectacle was amazing. In strong contrast with the bright, uninjured foliage on the trees in the valleys was the tattered, shreddy remnant of foliage on the trees covering the hilltops and the ridges. This gave the whole area a singularly bare aspect. There were great areas of brown fringed by the bright green of the valleys. As far as the eye could follow the line of the hill ranges, the same dreary prospect of crest and slope covered with denuded, apparently dead, trees and undergrowth was presented.

At the edge of the forest stood a fine young chestnut tree full of burrs, but completely denuded of leaves. Only the petiole and the mid-ribs of the leaves stuck out from the twigs. These made the tree seem scraggy, and with the clumps of burrs gave it a grotesque appearance that made one pity it.

A stiff breeze was blowing steadily from the north, and the swaying of the branches caused by it gave the animals all they could do to hold on. They were therefore mostly on the lower branches and on the undergrowth, and not feeding, but posing in their peculiar twig-like attitude, giving them the appearance for which they are named *Walking Stick*. It and the body-color harmonizing admirably with twigs on which they rest, make a most successful case of protective mimicry.

We found them thick on all kinds of trees and shrubs except hemlock, pine and dogwood. All else that grew in the forest and bore leaves was ravaged. Witch-hazel seemed more closely cropped than any other undergrowth, while the oaks, chestnuts and maples seemed to be special objects of attack. We found them thick on the buckwheat, but not feeding. They seemed to come here for protection from the wind, for the warm sunshine, and for mating, being of all sizes, ages and colors. Quite young ones are light green, becoming yellowish, greyish, brownish, and in the transition stages somewhat mottled. The sexes seem about equally numerous. The males are generally smaller, more slender, and lighter in color. The time of our observation seemed the height of the mating season. The female drops the eggs as they mature from any position she may occupy at the time. The eggs are ellipsoid in shape, somewhat flattened, very smooth and shiny black, with a white spot at one end, and a white line running from this end along the edge towards the other end.

Observations recorded in books state that the eggs hatch at various times, beginning with May. Many, however, seem to lie unhatched through the summer and another winter, and thus the insect appears in destructive numbers every alternate year.

I questioned the farmers about the times of their appearance in such vast numbers in this section. According to their observations there were very few last year. And the only time previous to this when they were extremely abundant was six years ago. From what we saw and could be learned, I feel that it is safe to say that several square miles are covered, but only on the hilltops. The trees and bushes in the valley are not affected as yet, though Mr. Lutz reports finding them very abundant some distance up the Lick Run Valley, in the trees and shrubs overhanging the brooks.

The ignorance and indifference of the farmers whose timber is being destroyed in this manner strikes one as most remarkable, and, of course, thoroughly deplorable.

The remedy suggested by the Economic Zoologist for the extermination of this pest is to burn over the tract late in the fall, before the eggs have sunk into the ground. The layer of fallen leaves is too thin to make a fire that will destroy the timber, but there will be sufficient fire to burn up the eggs.

D. S. HARTLINE.

June Berry, or Shad Bush. Amelanchier Canadensis, T. & G. (Sargent, Silva N. A., Vol. IV., p. 127, t. 194, 195.)

THE June Berry, or Shad Bush, is a small, variable tree, seldom more than thirty feet high in Pennsylvania, or more than a foot in diameter; much oftener a mere shrub, which runs into several more or less well-defined forms.

The bark on the older specimens is of a light gray color from the lichens which adhere to it; on the younger specimens it is of a reddish hue.

The heart wood is a reddish-brown, the sap wood being whiter, heavy, strong, and because of its close grain polishes well. It is hard when dry, but liable to split while seasoning. The wood is serviceable for a number of things, and has been suggested as a substitute for boxwood in the hands of the engraver.

The leaves (of typical form) are two to three inches long, somewhat heart-shaped at the base, and on footstalks from half an inch to an inch in length, sharp pointed, margins with smallish teeth sharp and irregular in size.

The flowers are white, appearing in April before the leaves, and are quite showy. It is in bloom about the time the shad are running in the Delaware River, and hence one of the common names in Pennsylvania.

The fruit is a quarter of an inch or more in diameter, dark purple, and edible when fully matured. The fruit is generally known in the northwestern region under the name of "service berries," and is largely used, being, in fact, the most desirable fruit of the country for cooking or for mixing with the pemmican (while it is being made) as an antiscorbutic.

If its size be taken as a guide, we may assume that the June Berry is essentially a tree of the north, which has degenerated in its present southern range. However, large specimens, even in Pennsylvania, are not wholly wanting. One tree in Monroe County had a diameter of about eighteen inches, and seemed to be in perfect vigor. I have also noted others almost as large.

Physical properties: specific gravity, 0.7838; percentage of ash, 0.55; relative approximate fuel value, 0.7795; weight in pounds of a cubic foot of dry wood, 48.85; relative strength, 26; hence the shad bush must be ranked among the strongest of our native woods.

J. T. ROTHROCK.

The bark on some of the Sequoia trees in California is often two feet thick and almost noncombustible. The fungus is an enemy unknown to it.

Forestry at Biltmore.

EVERYONE who has kept in touch with the advance of forestry in the United States within the last ten years has at least heard of the work being done at Biltmore, N. C., on the vast estate owned by Mr. George W. Vanderbilt. Nevertheless, it may be well to refresh the memory of the forestal public along this line, for the purpose of it all is a patriotic one—one of which no person in this country should be ignorant.

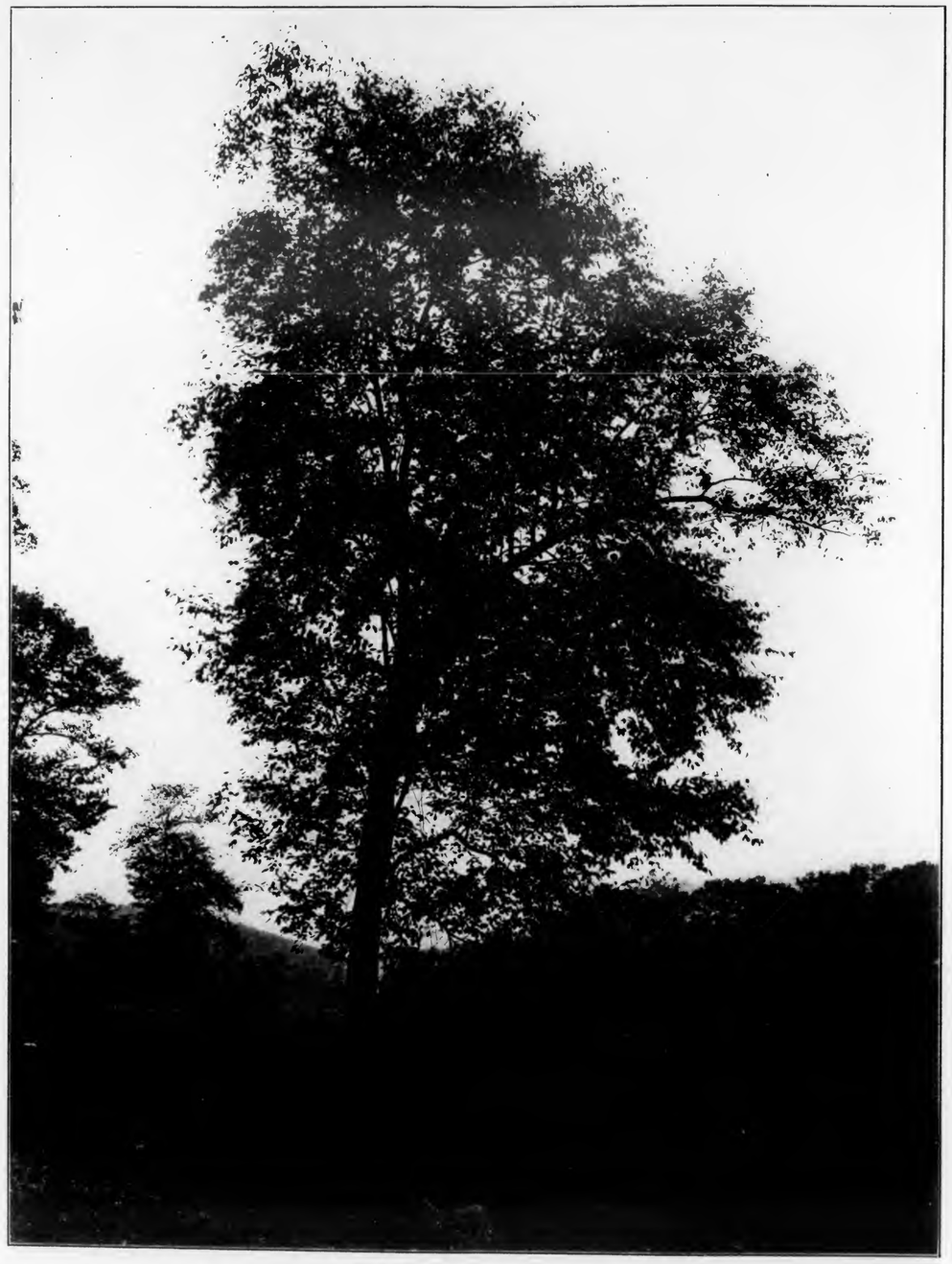
Under the control of the forester, Dr. C. A. Schenck, there are at present two separate tracts, namely, the Biltmore Estate proper, and what is called the Pisgah Forest.

The Biltmore Estate, comprising about 8000 acres, is situated within the mountain region of western North Carolina, at an altitude ranging from 2000 to 2500 feet. More definitely, it lies for the most part along the right bank of the French Broad river, above the mouth of the Swannanoa river, about one-fourth of the area being on the left bank. It is two miles distant from the city of Asheville.

In 1891, at the suggestion of a consulting forester, Mr. Vanderbilt placed under practical forestry management all that area not already under agriculture, or given over to the landscape department, "in order that from the result of such forest management conclusions might be drawn as to the practicability of introducing forestry at the present time and under the present condition of the lumber market in the United States."

The experiment was begun on about 3600 acres, with a system of improvement cuttings which should better the quality of the forest, and at the same time yield a net revenue from the sale of firewood and lumber. Notwithstanding the facts that for many years these woods were subject to frequent fires, and that from time to time the best timber was stolen, for several years there were sawed about 200,000 feet of boards, and about 2000 cords of firewood were cut annually. From the beginning there was being formed a comprehensive system of roads—forest drives and rough wood roads. In 1895 the first reforestation was done. About 50 acres were planted up "with indigenous species," partly for landscape purposes and partly for investigation into the rate of growth of these trees. Since then some planting has been done nearly every spring.

For facilitating management, the Estate is divided into four ranges made up of numerous compartments, each division having geographical or physical boundaries, consequently permanent ones. In charge of each range is a ranger, whose duty it is to supervise all work being done in his range,



JUNE BERRY, SHAD BUSH (AMELANCHIER CANADENSIS, T. & G.).
CHESTER COUNTY, PENNSYLVANIA.

TRUNK OF JUNE BERRY, SHAD BUSH (AMELANCHIER CANADENSIS, T. & G.).
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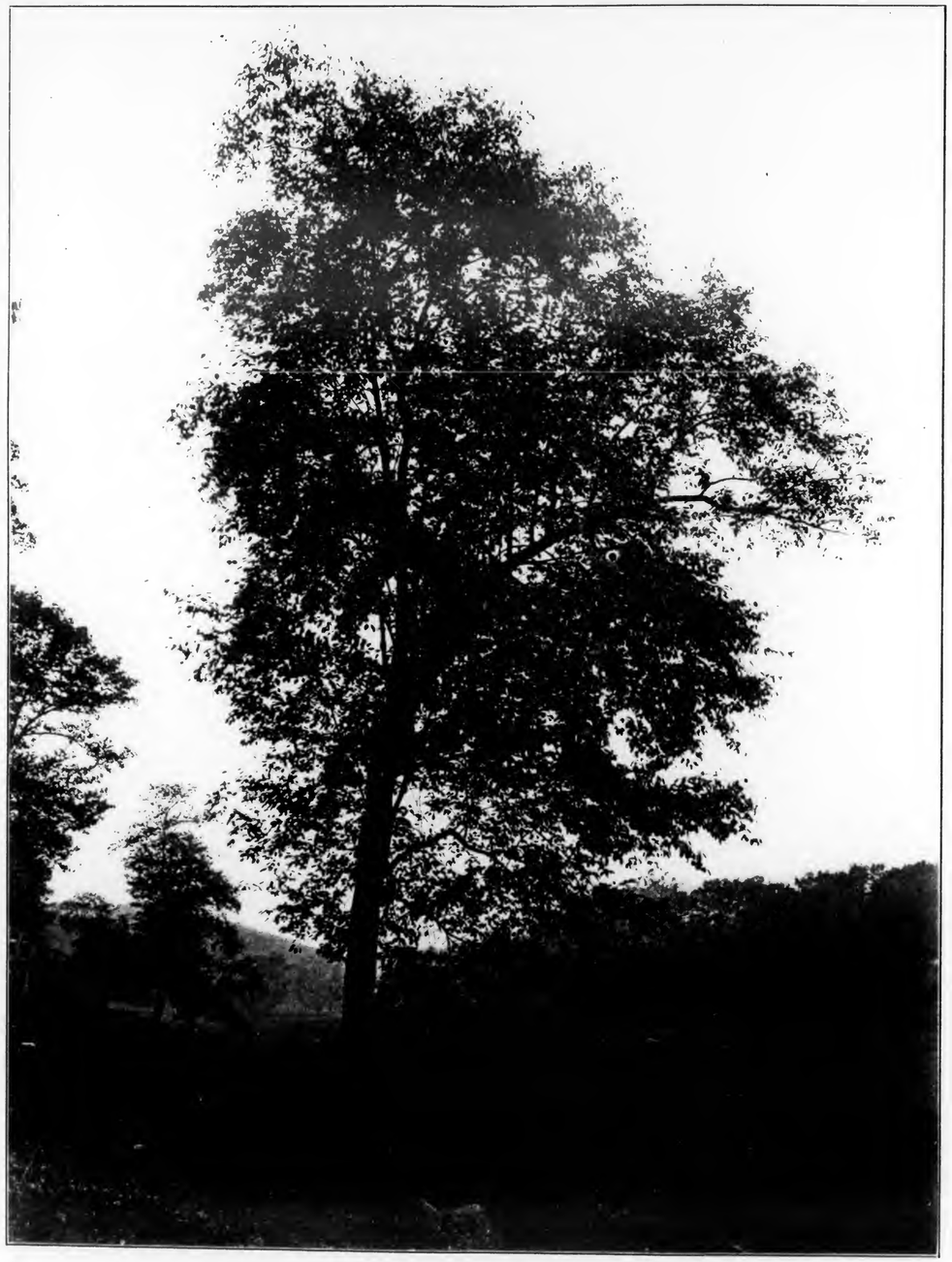

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INTENTIONAL SECOND EXPOSURE

such as the cutting of wood, building of roads, planting, etc., to care for his nurseries, and to act as guard, fire warden and game protector. Moreover, each ranger has been made a deputy sheriff. Their work is so arranged that they are kept busy the whole year, which allows them at the same time to keep a permanent force of laborers, a necessary requirement in forestry, for it is no little trouble to teach new men each year the few simple facts that they must know in order to do good, satisfactory work.

All cutting is done in winter while no sap is moving, thus avoiding the damage done to young growth in felling when the sap is present, as it is then barked most easily, or broken off entirely. Before any work is done by the laborers, everything to be cut must be marked. This is done under the direct supervision of the forester, and he determines the system of cutting to be adopted from the conditions and requirements of each particular piece of forest. If in a high forest, inducements are made for a natural regeneration of yellow poplar, oaks or pines by making openings in the forest cover, allowing the soil to become prepared for the reception of seeds and for successful germination, and if already there exists a crop of seedlings, "light" cuttings and the group system are the means of helping nature. The groups are gradually extended until they meet each other and finally form one continuous growth. In other places, where, as a result of frequent fires, nothing remains but poor sprouts of oaks and "weeds," clear cutting is thought to be the best system, as it results in good, healthy coppice, and at the same time offers a chance for pine to come in, or perhaps some other valuable species. Of course, if there are found any young trees that are likely to result in good growth, that is if they are straight and healthy, they are left, and later these will become "standards." Then again, the selection system may be carried on, in which only the mature and faulty trees, and such others as may be a hindrance to regeneration or to young growth, are taken out. And in still other localities several systems may be combined, or some new scheme adopted to suit the conditions.

As there remains very little wood fit for lumber, everything is made into firewood of several grades. All cutting is done by contractors who must work the trees into wood immediately after felling them, carry it to the wood roads, and pile it. In no case must a stump be over one foot high, and for trees below six inches in diameter, stumps must be less than a half foot high. The small branches are usually scattered over the ground after they have been removed from any young growth upon which they had fallen. This must be done as soon as the tree has been worked up, for then the sapling easily and quickly straightens itself. The wood, after it has been piled, is allowed to dry until the next summer or fall before it is removed for sale. In the meantime it has been measured, and the tally, after it has been verified, is kept at the office of the forestry department, so that the clerk knows constantly just what is on hand. There is, fortunately, a good demand for firewood in Asheville, and for the last few years between 4000 and 5000 cords have been cut and sold.

As the cutting advances, outlets necessarily must be made to remove the wood. The rough roads along which the wood is piled are trimmed out about eight feet wide, and just enough work is done on them to enable a wagon to travel over them. At the same time the system of forest drives is being extended. These are twelve-foot dirt roads, well laid out and graded, connecting the wood roads with the network of macadamized roads which extends over the Estate.

In each range there are several nurseries in which seedlings of indigenous species are raised principally, but a few foreigners are sometimes tried by way of experiment. The oaks and pines, especially the white pine, are in the majority. There are also walnut, ash, locust, yellow poplar, and a few honey locust, spruce, fir, larch, etc. As far as nursery work is concerned, weeding, protection from sun above ground, and from mice underground, seem to be most important. Weeding is done any time from spring to September. If done after that, frost is likely to lift the seedlings out of the loose earth. Billets are often placed between rows to keep down the weeds, or moss may be put in. Protection from the hot sun of summer is afforded by lath screens or frames, or by branches stuck into the ground. To lessen the damage from mice, either a ditch with perpendicular walls is dug entirely around the nursery, or the beds are made about five feet square and raised a foot from the surface of the paths between. Mice do not like to work in such beds because they come to light too frequently. Transplanting, of course, is done when necessary, as in the case of white pine, or when the beds become too crowded.

Several ponds for raising trout and bass have been built, and an effort is being made to stock all streams of the estate suitable for the fish. Various kinds of game birds have been let out, some doing well, but others of a migratory disposition having wandered away. Deer are being raised, and it is hoped to have some in the forest soon.

The Pisgah Forest, comprising 100,000 acres, more or less, lies southwest of Biltmore, the nearest point being five miles and the most distant about forty miles away, and is at the headwaters of the French Broad river. Within this tract is

Mt. Pisgah, with an altitude of 5750 feet. About one-third of the area consists of mountain tops and slopes, upon which only a poor growth of trees will ever exist. Part of this has a good sod and furnishes splendid pasture; consequently, as the principle of allotting each particular piece of ground to that use at which it pays best is followed, stock raising is carried on by the forester in such localities. The other two-thirds consists mainly of coves and valleys covered with scattered growth of oak, chestnut, yellow poplar, hemlock, hickory, etc. Here, too, because of the numerous fires which have run over the entire tract, the frequent logging operations, and the heavy pasturing, there remain but few trees fit for lumber. When the experiment was begun at Biltmore on a small scale, it was proposed to work forestry and lumbering combined on a larger scale by having about 80,000,000 board feet in logs floated down the river from Pisgah Forest to Asheville, and there worked up, together with what little timber could be had from the estate proper. Numerous difficulties were encountered, however, and very little was done at that time. Later it was found best to first open the tract by making numerous trails and a gradually increasing system of permanent graded roads, and then offer the timber to contractors who might saw the lumber on the tract itself, or where it suited them best. With the exception of some "weeding" or removing dead and spreading trees so as to favor young growth, road building is the important work at present. With good roads, fires are easily reached and controlled; stumpage price of timber is increased, and an opportunity is at hand to remove at any time any wood that may come into demand; farming the fertile bottoms is made possible or more remunerative because of the outlet for farm products and an easier exchange of necessities, and these farms in their clearings and in their occupants enhance the protection and benefit of the forest—in fact, with good roads the forest investment is made more profitable in every way.

There are still many interesting things that might be mentioned concerning this experiment, such as the results of plantations, the different sylvicultural experiments that have been and are being tried, the many difficulties that have been met, and, above all, the financial side of the question; but without these, and without debating whether forestry on a small scale pays, let it be known that the work at Biltmore is no longer an experiment as such, but a positive proof that forestry on a large scale does pay even under adverse conditions, and it must continue to do so, for conditions are becoming better every day. GEORGE H. WIRT,

Biltmore School of Forestry.

The Forests of America.

MR. JOHN P. BROWN, Secretary of the Indiana Forestry Association, has prepared an interesting and lengthy statement (too lengthy for use in FOREST LEAVES) to establish his claim that the forest areas of the United States are largely overestimated.

This is an important matter for all friends of forestry to be posted upon, and we present Mr. Brown's estimates as asserted facts of interest.

In his introductory the writer states the difficulties in arriving at conclusions as to what should and what should not be considered forest areas, and after detailing his methods of obtaining information, formulates his estimates.

Whether Mr. Brown is right or wrong, his efforts to collate information is commended, and we trust that this effort may prove of advantage to the country by either establishing the correctness of accepted figures or causing them to be revised.

Mr Brown says:

In a country so extensive as the United States, having no systematic forest policy, it will always be difficult to determine just what we possess of economic woods.

The efforts of this paper will be to consider, from the best obtainable information, what is the extent of our woodlands; how much is available for our middle States manufactures and lumber markets, and how long we may expect reasonably to continue the industries which are dependent upon forest products, and also to inquire if there be any means by which these various industries may be continued for a longer period.

Two hundred years ago the United States possessed a wealth of forests surpassed by no region of the world. For two hundred years the white man has been clearing these forests away, making homes, and in recent years making lumber, while to-day we are confronted with the prospect, at no distant time, of seeking other materials to take the place of wood in our manufactories.

There are, approximately, 2,968,700 square miles of land area of the United States, exclusive of distant territorial possessions.

The arid plains and treeless prairies cover 1,730,000 square miles, almost 60 per cent. of our area.

All of the clearings made through the past two hundred years; the cultivated farms of this and other timbered States; the vast areas which have been lumbered over, yet are not included in farms; and the thousands of square miles of blackened, fire-swept lands from which every tree has been destroyed, young growth killed, much of it absolute desert—all of these must be deducted from the 40 per cent. of the total area which was originally timbered. Assuredly this is an enormous decrease in the forests.

Yet the highest authority recognized by Congress, and accepted as the sole guide in forest matters, places our present forest area at 1,094,496 square miles, 37 per cent. of our total area.

The chief geographer of the United States Geological Survey places the average stand of timber upon the wooded lands of the "East" at 1500 feet per acre.

He classes the "East" as all of the United States east of 103° west longitude (being the eastern line of New Mexico), and vastly over-estimates the wooded areas; includes brush lands, abandoned farms on which more or less brush is growing, also innumerable farms in Indiana, Ohio, Kentucky and other States long under cultivation; makes no deduction for lands where for a hundred years have been continual cutting; nor takes into account the areas burned over and forests totally destroyed.

East of 103° west longitude are thirty-six States and two Territories.

Of these, six are prairie States, five have been partially examined by the Geological Survey, while in the remaining twenty-five States, comprising 1,152,747 square miles, the estimates of forest areas were taken from the Census Report of 1880. Since that census was taken, two decades of vigorous lumbering operations have destroyed more than half the forests.

In many of these States the most productive farm lands were forests twenty years ago.

It is claimed that the total stand of timber in the United States is 1,380,000,000,000 feet B. M., and that it will last fifty years; 750,000,000,000 feet is claimed for the "East."

The territory "East" of 103° west longitude contains 1,782,420 square miles, of which 782,840 square miles are prairie, leaving 999,580 square miles which at the discovery of America were, to a greater or less extent, wooded. Since that time great States have been cleared and opened to settlement, millionaires have gained their fortunes in lumbering other areas; disastrous fires have swept over vast areas, destroying all before them.

What should be classed as forest areas depends upon the object which is to be subserved. If to arrive at a reasonable estimation of economic forest products, then only woodlands which are available for lumbering should be considered. Extensive burned areas should be omitted. A few scattering trees in a pasture lot or along a creek bank do not by any means constitute a forest to be classed as woodlands in farms. Forests which have been cleared of all valuable trees, and turned over to the State as no longer worth the taxes, should be omitted from such estimates.

Broken and mountainous lands, partially covered with immature, worthless brush, having here and there a tree, give a very erroneous conception of our resources, when counted to swell the area of a State's forest wealth.

In asking my correspondents to give their opinions of forest areas in their various localities, I requested that such tracts be not considered.

True, if these be cared for, in fifty or one hundred years they will become remunerative, but the chances are for their destruction within another decade.

Mr. Brown then gives statements from a number of correspondents in different States on the forest areas remaining, and gives the following summary of forest areas:

	Square Miles.
New England, all required at home,	18,150
Eastern Atlantic group, all required at home,	35,900
Group of Southern States, export and shipment to eastern cities,	130,000
The Prairie group, insufficient for local use,	48,900
Pacific States, west of 103° west longitude of the latter, all exported,	212,400
Lake States group,	44,970
Central Manufacturing States, good, bad and indifferent,	80,000
Total for United States,	570,320

While the census of 1890 gave as the annual consumption of timber 28,488,997,000 feet, board measure, the annual consumption of wood as fuel reckoned to board measure for comparison was 180,000,000,000 feet.

The great commercial yards and larger manufactories will be limited to the last two groups, or 125,000 square miles.

If it were possible to average the yield over so large and varying a territory we might find one hundred and twenty-five billion feet of available lumber, while the result of another decade of energetic lumbering will startle this entire nation.

No matter how large a yield of timber the northwest corner of the United States will afford, what concerns the lumbermen of the middle manufacturing States is the available supply for this region. Mountain ranges, with great distances for transportation, will confine the dealer and the user to the limited area before described.

In the stress of great competion the lumbering concerns of this country are extravagantly wasteful of their forest property. Ambitious to accumulate largely in a short period, they lose sight of the more important consideration—permanency.

Innumerable enemies attend young forest growths. The critical period of a tree has passed when it is six or eight inches in diameter; after

that the growth is rapid. To destroy young growing trees is to prevent one's successors from reaping another crop of timber a few years hence.

Competition compels many lumbermen to acts which they recognize as unprofitable to themselves and unjust to the nation.

Education all along the line should be the watchword of forestry. And education does not cease with the school age; we learn all through life.

Thirty years hence our population will be 150,000,000, and whether or not they find a country as good as we now have, and timber resources of sufficient amplitude, will depend upon the wisdom, patriotism and justice of American citizens in this generation.

We have an ample forest area, including the immature growths, if fully protected, to furnish the lumber required for all future time. The States should enact wise laws and afford protection to the forests. If this shall not be done, then we are not performing a duty to our children who are now attending the public schools of the land, and who in a few years are to take our places in public life and business occupations.

Timber at the Pan-American Exposition.

FORESTRY and Mines were originally grouped together in the Pan-American plan, but plans have now been made for a separate building to represent the Forestry and Lumber interests. Many and varied interests will be housed therein, representing all branches of Forestry and its connection with the manufacturing interests of the country.

The general plan is that of a floor enclosed with a rail fence, though the elaborations and dimensions at once eliminate all commonplace suggestions. Stake and rider will not form a feature, though the locked ends and fence corners which are formed by the worm will lend themselves to the formation of artistic lodges and comfortable seats. As logs of considerable length will be used instead of rails, and the projections are in proportion, these primitive reception rooms assume considerable proportions.

Hickory, being a representative American wood, will be shown as an exhibit in a manner to illustrate why American carriages are preferred to all others in any country where they are known. Early shipments of American-made carriages to Europe could not be sold because of their lightness.

That was, however, before they understood the value of a thoroughly well-made hickory wheel having a diminutive elm hub fitted under pressure with steel or malleable flanges several sizes too small.

Petrified wood from Arizona will form a contrast to such exhibits of commercial value. Utility and ornamentation go hand in hand, and there is good reason in neighborly proximity in a great Exposition.

Big trees from California, representing the oldest living, will be shown as being historic as well as valuable. A plank of redwood six inches thick and six feet wide, without a flaw, will form a part of one exhibit.

A. J. Johnson, forestry commissioner of the State of Oregon to the Pan-American Exposition, is working hard to gather an exhibit that will properly represent the State in this important industry. One hundred and forty varieties of woods will be represented, many of which are very interesting.

California laurel wood is used in many ways and is constantly growing in favor. It readily lends itself to decorative purposes on account of its many colors and the high degree of polish it will receive. Cedars and other soft woods will make up a prominent part of Oregon's exhibit, though hard woods will not be neglected.

—An illustration of the present and prospective value of timber lands is furnished by the Charleston *News and Courier*, which tells, in a recent issue, how an unusually large white oak log, measuring 40 feet in length and 42 inches in diameter at the smaller end, was recently shipped from Savannah to a Northern firm. Its value, says our contemporary, when simply sawed into lumber for shipping, was estimated at $240. Smaller logs bring equally good prices in proportion, of course. In recent years timber lands in the South bearing similar lumber have been sold for $2, and even less, per acre. Landowners who disposed of or neglected their forest lands played a losing game in those years; but, now that the folly of such business has been brought home to them, it is not unlikely that they will profit by past lessons, and preserve and nurture their growing timber. Viewing recent developments in the lumber markets, it may not be amiss to suggest that the farmers having about forty acres or more on which oak is now growing could do nothing better than leave it alone, for it is more than probable that they will find it a good interest-payer, if not the most valuable part of their farm, in a few years to come.—*Farmers' Review.*

The Conference Committee.

EARLY last year a movement was started to have Committees from the Pennsylvania Forestry Association, the Pennsylvania State Sportsmen's and Game Protective Association, the Pennsylvania Fish Protective Association and the New Century Club hold a conference where matters affecting mutual interests, especially better enforcement of the present laws and amendments thereto, could be discussed for presentation to the State Legislature.

The initial meeting was held in Philadelphia on October 27th, the representatives of the Pennsylvania Forestry Association being Dr. J. T. Rothrock, W. S. Harvey and Dr. Bushrod W. James. Dr. Rothrock presided, and Mr. W. P. Thompson was made Secretary.

In addition to the four original organizations, advisory representatives were invited from the Pennsylvania Commissions of Forestry, Fish and Game, the State Board of Health, together with conferees from other associations, or officials or citizens, at the discretion of the President.

As Dr. Rothrock, in the revision of the conference, represented the Forestry Commission, Mr. Henry Budd was appointed in his place as a member of the Committee from the Pennsylvania Forestry Association.

The second meeting was held at Harrisburg on December 5th, there being a full representation from all the various organizations with one exception. Dr. Rothrock resigned as President, and Hon. Frank S. Harris was unanimously elected.

Extracts from the present laws in regard to forestry, fish, game and health were read, and their inefficiency mentioned. A committee was appointed to receive suggestions and prepare a comprehensive law.

A number of recommendations for improving the forest, game and fish laws were referred to this Reference Committee, who were to prepare them as bills for presentation to the Legislature, and report at the next meeting.

The third meeting was held in Philadelphia on December 20th. Several bills were submitted by the Board of Health, and one by the Pennsylvania Fish Commission, discussed, and given to the Reference Committee.

The fourth meeting was held in Harrisburg on January 3d, and the Reference Committee reported the following resolution, which was unanimously adopted:

"*Resolved*, That we read with the greatest interest, in the recent message of Governor Stone to the Legislature, his expressions relating to the restoration and preservation of the forests of the State, and the interests of Fish, Wild Game and Public Health connected therewith, and we believe that the thousands of citizens who are in the membership of the organizations represented in this conference from every county in this Commonwealth will cordially approve of the recommendations of Governor Stone, and unite with him in the endeavor to secure for the State the benefits which his liberal policy promises."

A number of bill and acts, some of which related to forestry, were also presented to the conference.

It is believed that by the united efforts of the various organizations represented in this conference much good can be accomplished by the furthering of bills or acts of mutual interest.

Suppression of Forest Fires.

CONSIDERABLE has been said as to the present forest fire laws encouraging lawless men to start them, and we think the following letter to the *Evening Express*, of Du Bois, states the matter in the proper way:

The best law can be no more effective than it is made by the parties most interested in it. Any law which provides for prompt suppression of forest fires ought to be a benefit to the community in which such fires occur.

It is altogether a side issue to say that paying to suppress forest fires encourages evil-disposed people to start them.

This statement is true or it is not true. If it is true, then these good citizens who make the assertion should at once inform on the parties who start such fires. It is a duty they owe the public, and they have no right to evade it. If the statement is not true, then it should not be uttered, for it is bearing false witness against one's neighbors.

Suppose, however, that it is true; that paying to suppress forest fires is an inducement to start them! What is to be done? Shall we cease to pay for the labor? No! for neither the State nor the County, any more than the individual, should ask that a citizen shall labor for nothing. It is right to pay for this work, and nothing can make it wrong to do so.

What is the remedy, if it is true that forest fires are started by men who wish to be paid for suppressing them? There is but one thing to do with a criminal who burns his neighbor's property. The law recognizes but one thing, and that is to punish him.

The object of the State is to protect its citizens. Government exists for no other purpose. If it fails in this it fails in everything. The citizen

pays his taxes for protection of life and property. The County or State receiving these taxes thereby becomes party to an agreement that the citizen shall be protected so far as possible.

He who pays his taxes is usually a law-abiding, State-supporting man. The person who starts a fire to be paid for extinguishing it is certainly a criminal, and probably a non-tax payer, because if he were a good citizen or a property holder he would not be driven to become an incendiary.

Whoever proposes to cease paying for the suppression of forest fires proposes to acknowledge that the authorities cannot, or will not, protect the law-abiding citizen against the lawless one. You may call this condition of things by what name you will, but it is practically anarchy. In addition to all this wrong against the property owner, demanding work without pay is an additional wrong to those who help to protect him.

There is but one right way to deal with this forest fire problem. Suppress the fire as soon as possible, pay for all services rendered, and punish any individual or corporation who either carelessly or otherwise burns up the forests on which the future prosperity of the State depends.

It is useless to assert that these criminals cannot be convicted. They have been convicted this year in every county where there was a determined effort made to find them. There can be no forest restoration so long as forest fires are allowed to rage unchecked.

If the forest fire laws are bad, enforce them. It is the best way to secure their repeal. If they are good, enforce them. It is the best way to discover their value. If your county officers fail to do their duty under the law by protecting the citizens who elected them, see to it that when you next elect officers you select such men as will do their whole duty without fear or favor. The citizens are responsible for the character of men whom they elect to office.

Yours, truly,

J. T. ROTHROCK.

—The Forestry Division of the U. S. Department of Agriculture has just issued Bulletin No. 29, entitled "The Forest Nursery," by Mr. Geo. B. Sudworth, dendrologist. The purpose of the monograph is to inform farmers and others interested in tree planting how to secure forest-tree seeds and to raise seedlings at a small cost. It treats of methods of collecting various tree seeds and care to be taken of them before planting, the propagation of trees from seeds and cuttings, wintering and transplanting seedlings, and use of wild seedlings—closing with a list of the useful timber-trees to plant. A number of appropriate illustrations add to the value of the treatise.

The Catalpa Tree.

ARTHUR F. YEGGY advocates the planting of the catalpa on the Western prairies, where this valuable tree would be of service in the amelioration of the climate. He says that the Indians in the Wabash Valley used the catalpa in preference to all other trees for making their wooden canoes, because its wood was easily wrought with their instruments, was light in weight, and lasted a long time. The wood has great moisture-resisting qualities. The large grass-green, heart-shaped leaves of the tree give a dense shade. The tree under favorable circumstances will grow sixty to eighty feet high, becoming from two to five feet in diameter. A catalpa tie holds railroad spikes well, and outlasts the best oak ties. The wood is a light straw color, and, though very compact, is as easily wrought as white pine. From the brilliant polish it takes it has been compared to San Domingo mahogany. It neither warps nor expands to any appreciable extent, and is recommended for cabinet work and the inside finish of houses. Already some enterprising men have planted large tracts of catalpa in the West, and they are likely to make a good investment. The Government forestry department, figuring on one of these catalpa plantations, says that the timber produced in ten years on one acre would yield a gross profit of $267.15. The expenses for that time, rent of land for ten years, raising the plant from seeds, planting, cultivation, sprouting and marketing, amount to $51.70. This leaves a net profit of $215.45 per acre for the ten years, or $21.54 per acre for each year of the first ten. When it is remembered that a farmer thinks prices and crops are good during the season that he makes $7.50 on an acre of grain, a catalpa grove, even in its youth, would appear to be by no means a poor investment. Mr. Yeggy says that from the tenth year on the great value of the plantation begins to dawn upon the planter. Then the trees average thirty feet in height, eight inches in diameter, and will make four or five fence posts. Twelve inches is the diameter of a fifteen-year-old catalpa, and telegraph poles can be made from any of them. When twenty years have passed, valuable soft timber is ready and a tree is worth three or four dollars.

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EDITORIALS.

THE creation of a Department of Forestry as a feature of the government of the State of Pennsylvania is an advanced step, the importance of which we should not minimize. But the friends of forestry are reminded that, having gained what is considered a signal victory, this should not encourage lassitude or indifference. To obtain full value of the advance made, each forward movement must be sustained, and the Forestry Commissioner and his associates, with their enlarged duties and responsibilities, will require the support of all who favor true forestry.

Problems are to be met, in the solution of which opposition, and possibly enmities, will be encountered; and in the performance of the work assigned to it the State Forestry Reservation Commission may not be continually basking in the sunshine of public favor, for any law which benefits the majority of the people is liable to work, or at least be interpreted as working, hardship to individuals. Under such management as our knowledge of the personnel of the Pennsylvania Forestry Reservation Commission assures us will be given to the forests of the State, the people will be honestly and equitably treated, and the friends of forestry should rally to the support of the Commission in a well-maintained effort to protect the present and increase the future forest areas of Pennsylvania. Public spirit must sustain the punishment of those who wantonly burn forest lands or mutilate standing timber. It must support the creation of forest reserves and the protection of streams and wooded areas. It must insist upon the execution of existing and the preparation of new laws to secure the greatest aid to true forestry, and that public spirit must be directed by the Pennsylvania Forestry Association, which is recognized as the exponent of true forestry in Pennsylvania.

J. B.

The creation of parks throughout the State by securing as preserves sites of special beauty, or those upon which tree growth is particularly impressive, is a subject appealing to those interested in forestry. The Pennsylvania Forestry Association has always encouraged the celebration of Arbor Day as allied to true forestry, and Miss Mira L. Dock, who is championing the creation of small reserves convenient to cities and towns, naturally sought to interest the officers of the Association in her plan. The Council, after carefully hearing the arguments, have referred the subject to a special committee, the function of which is to inquire into the practicability of securing such reservations, and the best method of holding and protecting the same.

The plan as outlined presents some perplexing details which can best be discussed by a committee. It may be possible to secure a number of park reserves through the generosity of individuals, but the acceptance of such land carries with it responsibility for its maintenance and expense for care-taking which must be provided for. J. B.

The Opportunity of the Hour.

FORESTRY in Pennsylvania has reached and passed "the parting of the ways." The State has entered upon the policy of restoring the waste and abandoned lands, which it comes into the possession of, to a productive condition. This task is one neither of sentiment nor of simply waiting. It is a business venture, into which the Commonwealth has gone because it is the only thing which offers any hope of restoring large portions of our area to usefulness, and because the experience of every nation which has tried it has proved it to be a sound, productive, financial policy. If success is to attend our work here it must be because we follow along the only lines which have led to success elsewhere.

The problem is a business one, and must be treated exactly as successful business men treat enterprises in which they are personally engaged. First, the State must protect what it already has; second, it must put its holdings into condition to yield the largest returns most promptly. The longer we delay acting upon these safe maxims the longer will we postpone the income from our investment and the more difficult and costly will it be to gain it.

It is fortunate, indeed, that Governor Stone has so clearly recognized the bearing of the forestry movement upon the prosperity of the State.

Since the administration of Governor Hartranft each of our chief executives has perceived that Pennsylvania was slowly but surely wasting an enormous source of wealth, and that something must be done to restore old forest conditions.

The people, however, were not, as a whole, ready for the change. A quarter of a century was required to create and mature the public sentiment in favor of forestry legislation. Even as it is, it required no little courage to enter as promptly and as vigorously upon the task of forest restoration as Governor Stone has done.

The creation of the new Department of Forestry has opened the way for securing perpetual representation of the forest interests of the State. With this Department comes also a State Forest Reservation Commission having power not only to purchase land for the State, but to properly care for and manage what it has. With the exception of New York, not a single State in the Union has commenced a scientific system of forest restoration as a source of revenue. New York has only done so because, after creating a school of forestry at Cornell University, it was necessary that sufficient woodland range should be given to illustrate practically every feature of forestry. Otherwise New York is, because of legal limitations, unable to illustrate any phase of lumbering (which is simply reaping the forest crop), or even of conducting improvement cuttings on the public land.

No such difficulty exists in regard to the powers of the Reservation Forestry Commission in this State. In the act creating the Department and the Commission ample authority is given to do with the State Reservation whatever is for the interest of the Commonwealth; no more ample power could have been conferred. It is to be hoped, therefore, that the gentlemen composing the Commission, together with the Governor, will at once, without any unnecessary delay, establish not only a proper protection against fires and thieves, but that they will also commence right speedily to lay the foundation for a really progressive, scientific system of forestry.

It required more than twenty years to bring the public to recognize the need of forest reservations and the good which will come out of them. It should not require as many months, now that the land has been acquired, with every sign of public approval, to commence plans which look to maintaining a constant succession of timber crops on this public ground. It is for this that it was purchased, and anything short of this will be a disappointment and a failure.

Economy is always proper, but parsimony is usually costly in the end. We ask those who have care of the State Forestry Reservations to deal by them as they would if they were their own. Money wisely spent produces money, and it is upon this hint that we hope these gentlemen will act.

Arbor Day Proclamation.

In the Name and by Authority of the Commonwealth of Pennsylvania. Executive Department. Proclamation.

THE rapid devastation of our forests has long since brought us to a realization of the danger to which such a course must lead. In the absence of prompt action, the growing demand of our industries would have soon stripped the mountains and plains of their wooded areas. Already the depletion of forests has influenced our climate and produced a marked effect upon the flow of the streams and rivers of the State.

Pennsylvania stands in the front rank of the States that realize the great importance of the forestry movement.

The legislature has endeavored to enlist our citizens in the work of repairing the injury already done, and has authorized the setting aside of special days upon which trees and shrubs are to be systematically planted.

Forest Reservations have been established, and the Department of Forestry, recently created, now has full charge of the State Reservations, which are to be increased by purchase and cultivation.

It is the duty of every one to aid in this beneficent work, which affects not only the State at large, but by protecting, improving and beautifying our highways, parks, school grounds and homes, reaches each individual in the Commonwealth.

Natural forces alone are not sufficient to do the work of restoring trees which have been removed by human agency. We must co-operate with nature in order to secure the greatest beauty about our homes, and to perpetuate the prosperity of our State.

In order that our citizens, both young and old, may have an opportunity to contribute their share to this successful and beneficent work,

I, William A. Stone, Governor of the Commonwealth of Pennsylvania, in accordance with law, do hereby designate and proclaim Friday, the twelfth day of April, and Friday, the twenty-sixth day of April, A.D. 1901, to be observed as Arbor Days throughout the Commonwealth.

Two days are set apart for the observance of this custom. Inasmuch as the climatic conditions may render one of these days more favorable for the purpose intended than the other, the selection is left with the citizens of the various sections of the Commonwealth.

Given under my hand and the Great Seal of the State at the City of Harrisburg, this twenty-ninth day of March, in the year of our Lord one thousand nine hundred and one, and of the Commonwealth the one hundred and twenty-fifth.

WILLIAM A. STONE.

{SEAL}

By the Governor:

WILLIAM W. GRIEST,
Secretary of the Commonwealth.

New Pennsylvania Forestry Legislation.

ACT No. 24, establishing a Department of Forestry, which is to provide for its proper administration, to regulate the acquisition of land for the Commonwealth, and the control, protection and maintenance of Forestry Reservations by the Department of Forestry, was given in the last issue. This act was amended by the House of Representatives, so that in no case where a tract of land was purchased for forestry reservations should the cost exceed the sum of $5 per acre. The bill was still further amended in the Senate, so that, when timber was to be sold or mining rights disposed of in the forestry reservations, the proposed contracts or leases shall be advertised for one month in three near-by newspapers, and awarded to the highest bidder, who is to give a bond for its faithful performance. One-half of any net revenue derived by the State from such sales or contracts is to be turned over to the treasurer of the township in which the lands are situated, to be used for township purposes and the reduction of local tax levies; it is, however, provided that there shall not be paid to any township during any year more than twice the amount of taxes which would be received by such township from said lands if they were owned by individuals.

The bill thus amended was passed by the Senate, the amendment concurred in by the House of Representatives, signed by the Governor, and is now a law.

It is a pleasure to advise our readers that the Governor has continued in office those who formed the Forestry Commission under the former law, and who have rendered the State such signal service.

In addition to Senate Bill No. 20, amending the act of June 1, 1887, for the encouragement of forest culture, etc., which was printed in the February number, the following bills are also being considered:

No. 152, Session of 1901.

An Act for the better protection of timber lands against fire, and providing for the expenses of the same, and directing what shall be done with the fines collected and costs paid.

SECTION 1.—Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That when the commissioners of any county or counties fail to "appoint persons under oath whose duty it shall be to ferret out and bring to punishment all persons or corporations who either wilfully or otherwise cause the burning of timber lands within their respective counties," as is provided by the act of July fifteenth, one thousand eight hundred and ninety-seven, or when they have appointed inefficient persons to do the work aforesaid, the Commissioner of Forestry may, on the request of residents of a county in which such fires have been created, or on the request of the owner or owners of land which has been injured by the fires so created, appoint a detective or detectives and employ an attorney or attorneys to ferret out and bring to punishment, as aforesaid, those who cause the burning of timber lands; and all expenses incurred by the Commissioner of Forestry under the operation of this act shall be paid by the State Treasurer on warrant drawn by the Auditor General, if the said bills shall be approved by the Governor and the Commissioner of Forestry; and all the fines collected shall be paid by the magistrate or by order of the court to the Commissioner of Forestry, and be paid by him to the Treasurer of the Commonwealth.

SEC. 2.—When conviction is obtained under the provisions of this act of persons or corporations causing the burning of timber lands, then the Auditor General, on the request of the Commissioner of Forestry, may refuse to pay the State's share of the money due to the county for the services of the person or persons appointed by the county commissioners to ferret out and bring to punishment those who caused forest fires in the districts where such persons served as fire detectives, and for which conviction was obtained.

No. 153, Session of 1901.

An Act to encourage the preservation of forests by providing for a rebate of certain taxes levied thereon.

SECTION 1.—Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That in consideration of the public benefit to be derived from the retention of forest or timber trees, the owner or owners of land in this Commonwealth having on it forest or timber trees averaging not less than fifty trees to the acre, each of said trees to measure at least eight inches in diameter at a height of six feet above the surface of the ground, with no portion of the said land absolutely cleared of the said trees, shall, upon filing with the county treasurer of their respective counties, and with the tax collectors of their respective townships or districts, an affidavit made by said owner or owners, or by some one in his, her or their behalf, setting forth the number of acres of timber land within the requirements of this act, be entitled to receive annually, during the period that the said trees are maintained in good condition upon the said land, a rebate equal to eighty percentum of taxes, local and county, annually assessed and paid upon said land, or so much of the eighty percentum as shall not exceed in all the sum of forty-five cents per acre; the said rebate to be deducted from said taxes pro rata and receipted for by the respective tax collectors or county treasurers. Provided, however, That no one property owner shall be entitled to receive said rebate on more than fifty acres.

SEC. 2.—All acts or parts of acts inconsistent herewith are hereby repealed.

No. 223, Session of 1901.

An Act authorizing boroughs of this Commonwealth to require the planting of shade trees along the public streets thereof by the owners of abutting property in certain cases.

SECTION 1.—Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That the burgess and council of any borough of this Commonwealth, upon the petition of a majority of the property owners upon any public street thereof, may by ordinance require the planting and replanting of suitable shade trees along and upon either side of any such street upon such alignment and at such points as may by such ordinance be designated, by the owner or owners of property abutting the street at the points designated; and on failure of any such owner or owners after reasonable notice to comply with the terms of any such ordinances, the said authorities may cause such trees to be planted or replanted at the expense of the borough, and thereupon, in the name of the borough, collect such expense from the owner or owners, in default as debts of like amount are by law collectable. Provided, That the said authorities shall not require the planting or replanting of trees at any point or points which may interfere with the necessary or reasonable use of any street or abutting property, or interfere unreasonably with any business thereon conducted.

No. 225, Session of 1901.

An Act to encourage the planting of trees along the roadsides of this Commonwealth, and providing a penalty for killing, removing or injuring the same, what disposition is to be made of moneys collected as penalties, and for keeping a record by the supervisor of roads or boards of supervisors of roads of the trees so planted and upon which a tax abatement has been granted.

SECTION 1.—Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, That any person liable to road tax who shall transplant to the side of the public highway on his own premises any fruit, shade or forest trees of suitable size, shall be allowed by the supervisor of roads or boards of supervisors of roads where roads run through or adjoin cultivated fields, in abatement of his road tax, one dollar for every two trees set out; but no row of elms shall be placed nearer than seventy feet, no row of maples or other forest trees nearer than fifty feet except locust and Carolina poplar, which may be set thirty feet apart, and except fruit trees, which may be set forty feet apart; and no allowance, as before mentioned, shall be made unless such trees shall have been set out the year previous to the demand for such abatement of tax, and are living and well protected from domestic animals at the time of such demand.

SEC. 2.—Any fruit, shade or forest trees growing naturally by the side of the public highway where said public highway runs through cultivated lands shall be allowed for in the same manner and on the same conditions as in the preceding section.

SEC. 3.—Any trees transplanted by the side of the public highways as aforesaid, in the place of trees that have died, shall be allowed for in the same manner and on the same conditions as in the first section of this act.

SEC. 4.—No person shall be allowed an abatement as aforesaid of more than one-quarter of his annual road tax.

SEC. 5.—Any person who shall cut down, kill or injure any living tree, planted or growing naturally, as aforesaid, or who negligently or carelessly suffers a horse or other domestic animal driven by or for him to injure any of the trees hereinbefore mentioned, upon conviction thereof shall be subject to a penalty of not less than one dollar nor more than five dollars, with costs of suit, for each and every tree so cut down, killed, removed or injured. Provided, That if the defendant or defendants neglect or refuse to pay at once the penalty so imposed and costs, or shall not enter sufficient bail for the payment of the same within ten days, he or they shall be committed to the common jail of the county in which the offense was committed for a period of not less than one day for each dollar of penalty imposed and costs. Provided, however, that the owner of the land upon which the trees are growing, and upon which said abatement has been granted, may remove such trees on condition that he will immediately plant and maintain another tree or trees in the place or places of those removed by him, or refund to township said abatement originally allowed for said tree or trees.

SEC. 6.—All moneys collected as a penalty in accordance with section five of this act shall be paid to the supervisors of roads or boards of supervisors of roads, and form part of the road fund of the township in which the offense was committed.

SEC. 7.—It shall be the duty of the supervisor of roads or the boards of supervisors of roads to keep a permanent record in a book especially prepared for that purpose, and which book shall be the property of the township, of all trees upon which the said abatement as hereinbefore mentioned has been granted; and when any tree or trees have been removed, with or without the consent of the supervisors of roads or boards of supervisors of roads, the date thereof shall be distinctly entered in the said book.

SEC. 8.—The act approved the second day of May, Anno Domini one thousand eight hundred and seventy-nine, entitled "An act to encourage the planting of trees along the roadsides in this Commonwealth," is hereby repealed.

The Yale Summer School of Forestry will hold its sessions at Grey Towers, near Milford, Pike County, Pa., on the west bank of the Delaware river. The purpose of this school is to provide instruction in forestry for those who do not wish to take the more advanced technical courses at regular forest schools. Mr. James Pinchot has given the use of his woods, a tract of about sixty acres, and also considerable open ground for work in tree-planting. There are also larger forests in the neighborhood for practical study in silviculture and forest botany. The courses embrace forest botany, silviculture, forest measurements, introduction to forestry, forest protection and field work.

Forest Conservation in Kentucky.

WE had lately an opportunity to see some of the practical results which have followed the efforts of Mr. John B. Atkinson, President of the St. Bernard Coal Company, to conserve the forests upon the lands of the company in Hopkins county, Kentucky, and to propagate new growth.

In our issue of December, 1897, we called attention to Mr. Atkinson's work as exemplified by the exhibit of his company at the Tennessee Centennial Exposition at Nashville, and during our visit we had opportunity to judge of the results achieved.

In mining 900,000 tons of coal annually the St. Bernard Coal Company requires timber for mine props, tramway and railway ties, buildings, etc., much of which is obtained from its own property, but by selecting only mature trees, usually two feet in diameter of trunk, or those which should be cut, the wooded area is maintained as a permanent feature of the estate, and by thoroughly utilizing the wood as felled the reduction of the timbered area is less rapid. In addition to this, systematic tree-planting offers promise of future value. We noted two groves of young black walnut trees planted eleven years ago, one of which is left to be thinned out by Nature to determine the survival of the fittest, the other being carefully thinned each year. At the present time the forested grove appears to best advantage. In each grove the scheme is to have the mature trees so thickly planted as to secure large trunk growth rather than limb development, as the purpose is to secure the maximum lumber product rather than a liberal supply of nuts.

Central Kentucky is the home of the black walnut, but wasteful cutting, and even burning, of this valuable wood has left but few mature trees standing. Mr. Atkinson is striving to produce a supply for the future, and besides the intrinsic value of this fairly rapid-growing species, he finds satisfaction in the fact that the limited leaf-deposit and the general absence of undergrowth in the groves offer excellent protection against forest fires.

Besides black walnut, the following are being liberally propagated and cared for, viz., white oaks (two *alba* and two *Michauxii*) and the tulip tree.

Mr. Atkinson's appreciation of the Kentucky forests may best be given in his own words: "Especially in its great forests is a great heritage being now rapidly and riotously exhausted, with no regard for the future. The oaks, hickories, tulip, gums, chestnuts, maples, beeches, sycamores, ash, elms, cypress, walnuts, etc., grow to a perfection equalled in but few States of this country of ours. Only in Missouri and Tennessee, perhaps, can the variety and value of timber be found to equal that of Kentucky. . . . Eight species of white oaks and eleven of black oaks are found in the State.

"With probably half the State still occupied by forest, and with the knowledge that almost every part of this is reached by the logger or the saw-mill, it is difficult to estimate now how much oak or other lumber is still available. Enormous drains have been made the past few years, and it is well known in the great hard-wood markets that the quality of the oak sent to market in rafts is very inferior to that of a few years ago. Smaller trees are cut, and timber is sent that would have been refused a few years ago.

"In Hopkins county the average age of eighteen white oaks, grown to a diameter across the stump of 12 inches, was 100 years. The youngest tree of the lot to reach 12 inches was 75 years old; the oldest one of the lot was 135 years.

"Twenty white oak trees, with an average diameter of 28 inches at the stump, gave an average age of 204 years. The youngest tree was 149 years, with a diameter of 24 inches; the oldest tree was 312 years old, with a diameter of 36 inches. But five trees of this lot were 30 inches in diameter and upward. These twenty white oak trees would not cut an average of 700 feet, B. M., each. Think of it!—204 years to produce 700 feet of white oak plank, and the thrifty farmer will sell the saw-mill man this 700 feet for $2.80, and think he has made a good sale.

"An estimate made in 1892 of the available timber in the State gave 83,000,000,000 of feet. Of this, 40 per cent. was oak of the various varieties, 3 per cent. of tulip, 2 per cent. of walnut, 5 per cent. gum, 4 per cent. hickory, 5 per cent. beech, and 3 per cent. sycamore.

"This estimate was on 13,000,000 acres of forest, an average of 6400 feet, B. M., of timber to the acre, which was probably a very liberal estimate. To show what timber one acre can produce I selected the finest tract of timber I know of in the State (and it is in Hopkins county), measuring off three selected acres 200 x 217 each. Only taking trees 24 inches in diameter and over, I found the first acre had growing on it 35,860 feet B. M.—a total of nineteen trees. The largest tree on this acre was a white oak containing 5780 feet B. M.

"The second acre gave 49,628 feet B. M.—a total of twenty-one trees. The largest tree was a white oak containing 7016 B. M. of timber. This tree would cut a log 82 feet long. A second white oak on this acre 72 feet high would cut 5512 feet.

"The third acre gave 50,146 feet B. M.

"A fourth selected piece, 300 feet by 100 feet, or three-fourths of an acre, gave in fourteen white oak trees 49,198 B. M.; three black oak trees, 10,570 B. M.—a total oak growth over 24 inches diameter of 59,768 B. M.

"A total of twenty-five trees, the largest a white oak 80 feet high, containing 6846 feet B. M. lumber. Every mill man tells us that we are fast using up our forests. Our Kentucky Legislature is generous in laws to regulate almost everything under the sun, but so far has failed to take an interest in the preservation of our forests.

"It is a difficult problem, only to be solved by co-operation of the general and State governments and the owners of forest lands. In Germany much attention has been given to forestry. In fourteen State administrations, covering 10,000,000 acres, the cut per acre per year for ten years was 55 cubic feet. Of this only 15 cubic feet was lumber, or 120 feet, B. M., to the acre. This cut was supposed to represent the annual growth. This would mean that the 13,000,000 acres of forest land in Kentucky would produce yearly 1,560,000,000 feet, B. M., and 520,000,000 cubic feet of wood for use as fuel, charcoal, etc. This means that at $4 per 1000 feet, B. M., on the stump the annual growth of lumber in the entire State is worth $6,240,000, or less than 50 cents per acre. To this add the 520,000,000 cubic feet unfit for lumber, say 7,500,000 cords, fit only for fuel or charcoal, at 15 cents per cord, and we get $1,100,000 to add to the lumber value of the annual growth, making a total of $7,340,000 as the value of our annual lumber crop, a gift from Nature. What can we do to preserve this wealth?

"On every hand we see wanton destruction. The farmer, so-called, wears out his cleared land and then the forest is girdled for new corn and tobacco patches. The worn-out land is turned over to Nature, which produces, in seeming satire, sassafras and persimmon where walnut, oak and tulip trees once grew. The real farmer never wears out lands, and only needs to clear woodland that he can increase his crops. There is enough cleared land in Kentucky to produce many times the crops now produced. This simply requires better farming. Let us keep every acre of forest we now have; let us cut only matured trees, or only those of large size; plant walnut, white oak and tulip trees in the places suited to their growth, and prevent forest fires. Unlike the mineral wealth of the State, which, when exhausted, cannot be replaced, an acre of forest can be made perpetual.

"One of the companies with which I am associated holds a large landed estate, much of it forest. For a number of years it has planted each year fifty to sixty bushels of black walnuts in places where the timber has been cut or on the worn-out fields above referred to, anywhere a large tree has a chance to grow. In the fall, acorns from the best oaks are planted in small pots in the greenhouse. Spring finds the young oak ready to be transplanted to any part of the forest where there is room for it. The young tulip trees, just from the seed in the spring, are gathered and put into pots or transplanted in the nursery to get sufficient growth to enable them to make a successful fight for life when placed in the forest where wanted. Generally our forests are open to the cow and pig, hence the acorn or the young tulip tree has a poor show for growth unless treated as mentioned above.

"In cutting timber, the rule is to cut no tree less than 24 inches in diameter, unless it shows signs of decay. We have made only a weak attempt toward the preservation of our forests, but it is an attempt in the right direction. We consume in our mining operations more than one million feet of timber yearly, and it behooves us to take care of our heritage.

"Our first effort in planting walnuts was on a four-acre piece of land in 1888. The nuts were gathered in the fall when ripe; the ground was plowed and prepared as for corn, and the nuts planted 4 feet apart to allow the young tree 16 square feet of growing space. One acre of this experimental walnut forest has not been disturbed, it being left to Nature. On the other three acres the trees have been thinned out until on the best land at least 70 per cent. of the trees have been removed, the largest of the trees remaining being full 6 inches across the stump, the trees 20 to 28 feet high. On the acre left in the care of Nature the trees are smaller in diameter, but nearly as high. The trees taken out have been transplanted, in most cases with indifferent success, the effort being made to transplant in open fields used as pastures.

"In the past ten years we have planted inclosures in walnuts to the extent of twenty-five to thirty acres, a few acres every one or two years."

An Act has been introduced in the Legislature to stop the crippling of deer, and provides that from and after the passage of the act it shall be unlawful to chase, hunt, shoot, kill or destroy any buck, doe or fawn at any time with any weapon containing or loaded with more than one bullet, shot or missile for each load intended to be fired.

Any person or persons offending against the provisions of the act shall be liable to a fine of twenty-five dollars for each and every offence, to be sued for and recovered before any alderman, magistrate or justice of the peace.

The Willow Oak and Swamp Hickory.

THE willow oak (*Quercus Phellos, L.*) can hardly be regarded as a Pennsylvania forest tree, although specimens are occasionally met with, ranging from Staten Island to Florida and west to Missouri and Texas. It takes its common name from the leaves, which somewhat resemble the willow in shape, being linear-lanceolate, narrowed at both ends, and three to four inches long. The acorns mature every second year, rather round in shape, the base being inclosed in a saucer-shaped cup. The wood is coarse-grained and of a reddish color.

It is a rather handsome tree, usually from 30 to 80 feet in height. The illustration, for which we are indebted to Mr. Stuart Wood, represents a tree about eighty feet high and about the same spread of limb, growing at Macon, Ga.

The Water Hickory, Swamp Hickory or Bitter Pecan (*Hicoria aquatica Britton*) is a tree which sometimes attains a height of 60 to 80 feet and a diameter of 2 to 3 feet, but is generally much smaller, being but 12 inches in the one shown. The illustration is that of a tree standing near Earlington, Ky., and shows the peculiar method in which the bark is fastened at the upper end, like a roof covered by oaken boards after years of service.

The wood is heavy, soft, strong, but rather brittle and close grained, of a dark brown color, while the sap wood is lighter, being often almost white. It is used for fencing, fuel, etc. The leaflets are seven to eleven, oblong-lanceolate, pointed and smooth.

The fruit is a small nut, shaped something like our shellbark, but without the sharp ridges, being an oval, four ribbed or angled, the husk is thin and the kernel very bitter.

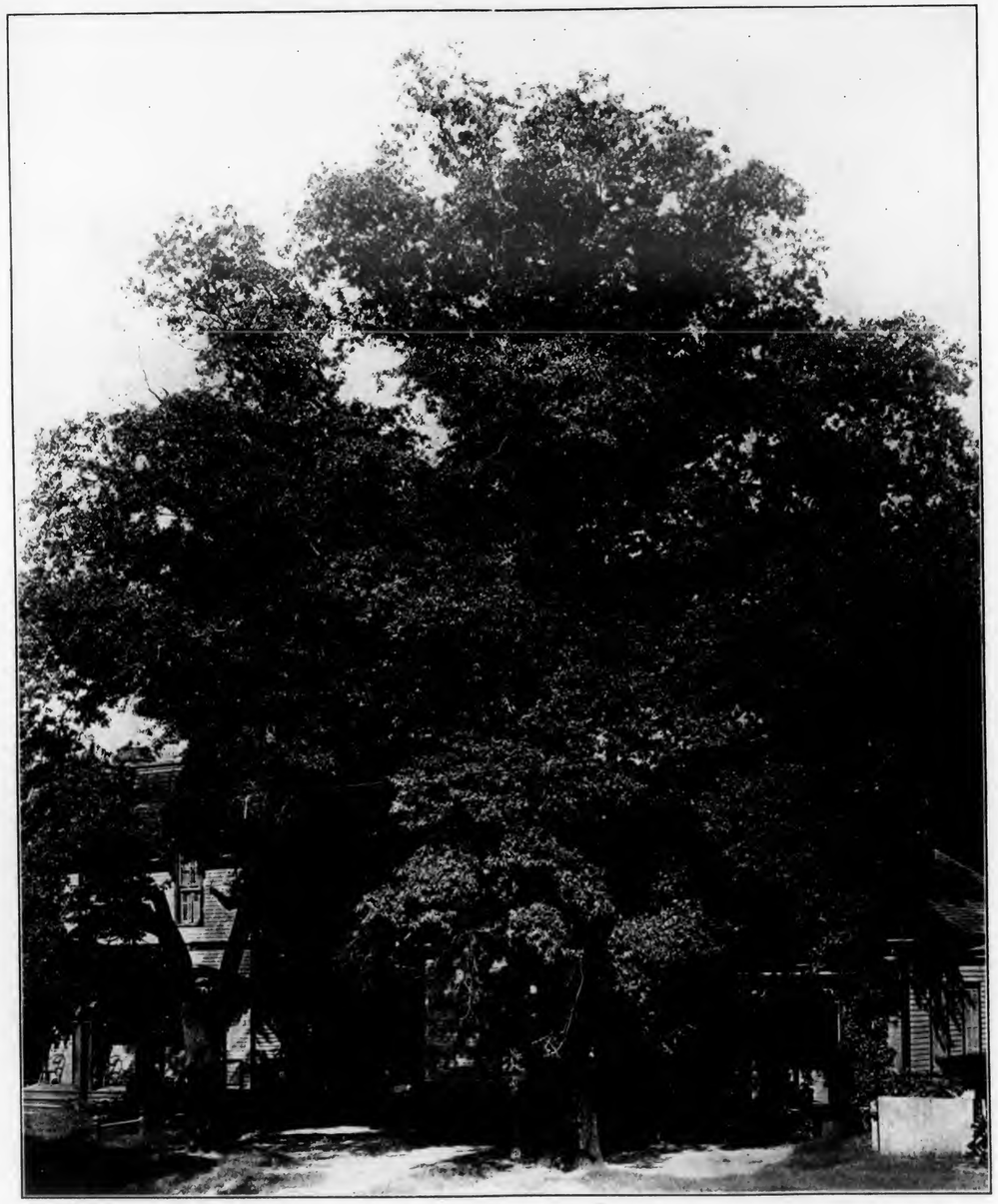
The tree is found extending from North Carolina to Florida and westward to Louisiana, Arkansas and Texas, reaching its greatest development in Mississippi.

Wood is made up of very small tubes or cells of various kinds. Some conduct water from the roots to the crown, some store away digested food, others merely strengthen the structure of the wood. Some of the cells have thick walls and small openings; and others thin walls and wide openings. Those last mentioned are in this country formed in the Spring, when there is a great demand for water to supply the new moist, green parts of the tree. Later on, when the demand is not so great, the cells formed are narrow and thick-walled.

The New Forestry Bill.

THERE is one phase of Governor Stone's administration that has apparently attracted little attention, and yet it is of the utmost importance to the welfare of this State. We refer to the forestry question. Governor Stone has done everything in his power to advance the forestry interests of Pennsylvania. Last month he signed the bill creating a Department of Forestry, and reappointed as Forestry Commissioner, for a term of four years, Dr. J. T. Rothrock, whose untiring energy and devotion to his work have made possible the wonderful advancement that has taken place in this direction in so short a period. The friends of forestry have abundant reason to thank Governor Stone for his interest in the matter, for he has done all that any one could do for forestry—and all that they have asked for.

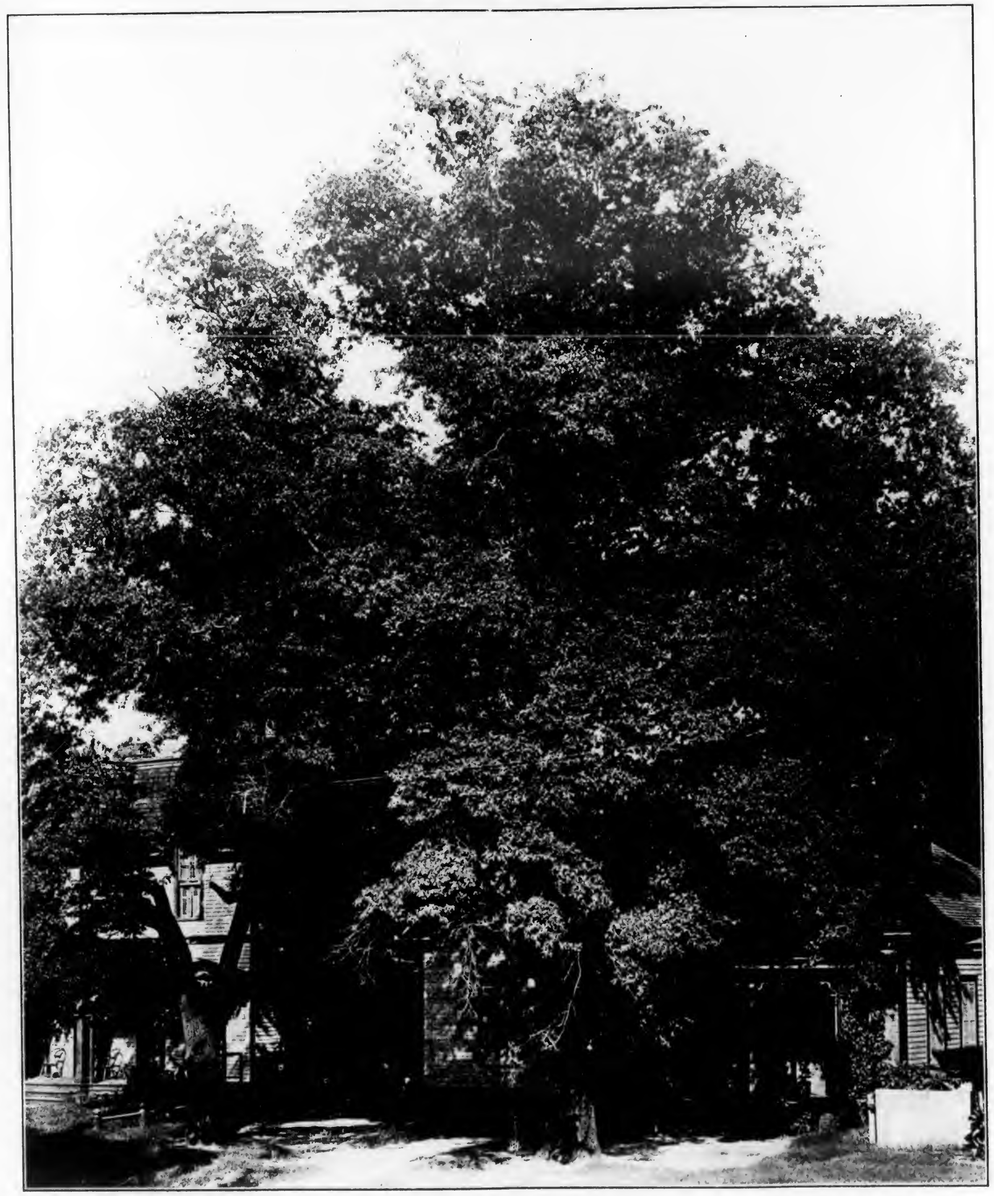
Pennsylvania is the only State in the Union, we believe, which has recognized the importance of forestry to the extent of making a separate and distinct State Department in its interest. In addition to creating the new department, the bill gives to the Forestry Reservation Commission full power to purchase land in any portion of the State where, in their judgment, such reservation should be located. The Commission has the power to protect and care for the land so obtained. It can lease the State lands for mining purposes wherever valuable minerals are supposed or known to exist, and it can cut and sell timber when it is in the interests of the reservations that it should be done. While the State will pay no taxes on lands which it has acquired, it does undertake the care of roads running through these tracts, and twenty-five dollars a mile may be annually expended upon them. This may seem like a small sum, but it is nearly twice what the average country road in those districts now receives. When a net revenue arises from the sale of minerals on the public domain, one-half of the same goes to the general fund of the district furnishing the revenue. This is designed to meet the additional expenses, such as the cost of schools, incident to the increase of the population needed to do the work on the public ground. Consequently, the counties in which the reservations are located will have ample amends made to them for any loss they may suffer by the removal of State lands from taxation. The Forestry Bill has been fully considered in all its details by those in a position to speak with authority, and is regarded by them to be an equitable measure. We trust that the Forestry Reservation Commission will have the full courage of its convictions and go



WILLOW OAK. (QUERCUS PHELLOS L.)
MACON GEORGIA.

FOREST LEAVES, VOL. VIII., NO. 2.

TRUNK OF WATER OR SWAMP HICKORY. (HICORIA AQUATICA BRITTON.)
NEAR EARLINGTON, KENTUCKY.



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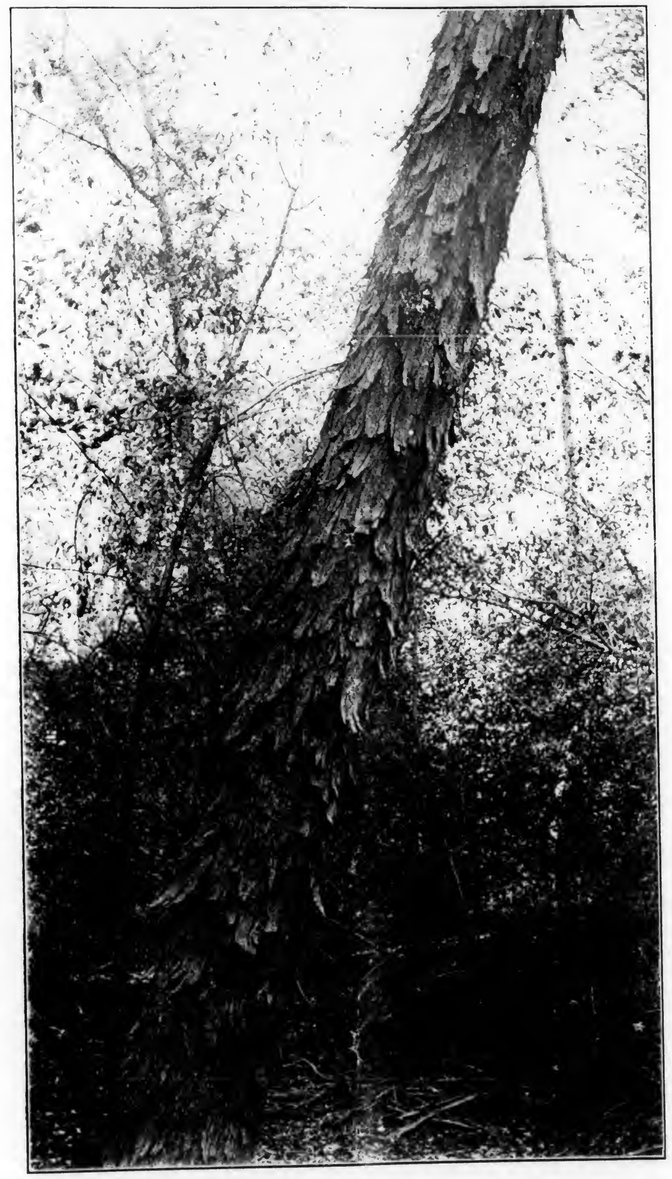

TRUNK OF WATER OR SWAMP HICKORY. (HICORIA AQUATICA BRITTON.)
NEAR EARLINGTON, KENTUCKY.

INTENTIONAL SECOND EXPOSURE

vigorously ahead with its important work, conducting its operations on liberal principles, so that the State may promptly reap the benefit of its efforts. This is the time for a new era in Pennsylvania forestry.—*City and State.*

Game Preserves and Forestry.

A MOVEMENT which is absorbing a considerable quantity of the wild lands of the State arises from the demand of wealthy sportsmen for hunting grounds, where game birds and animals can be bred and hunted in season, and where, by reserving the privileges of hunting to themselves, they can always be assured of sport. Clubs and individuals are constantly taking advantage of the cheapness of these lands, which are of little value for agricultural purposes, and transactions involving several thousand acres each are frequent. These are usually the same sort of lands as those which are being purchased by the State for the purpose of conserving the timber supply and protecting the sources of streams. It is not known what these holdings amount to in the aggregate, but they are perhaps as large, or even larger, than the acreage that has thus far been acquired by the Commonwealth.

There appears to be an opportunity here which, if properly taken advantage of, may help along the work of forestry already begun. It ought to be possible for the State forestry authorities to arrange for some sort of co-operation with the owners of these tracts. They are generally intelligent and public-spirited men, with a full realization of the general benefits of scientific forestry, and they must be aware that the increase of the tree-bearing area of the State would tend directly to promote and aid the objects which they are trying to accomplish in procuring these reservations. If the right efforts are made, the active assistance and co-operation of these promoters of hunting and fishing, and their adherence to the general plans of the Forestry Board, could be secured, to the manifest advantage of both interests.

The spring courses for the junior and senior year students in the New York State College Forest at Axton will begin on April 16. In addition to the practical forestry work in silviculture, forest mensuration, surveying, exploitation, forest regulation and timber estimating, there will be a course on fish culture and game preservation.

Education in Forestry.

BECAUSE the figures show that the white pine lumber product of the United States has passed its zenth and is gradually declining, there are those who are greatly alarmed lest the country should be without lumber within a few years. The facts of the case are, as stated by Henry Gannett, of the United States Geological Survey, that with reasonable care in their preservation and utilization the forests of the United States are sufficient to maintain a supply of lumber equal to or even greater than that required by the present demand of the country in perpetuity.

On the one hand the public is likely to be too optimistic in regard to this matter, and on the other hand too pessimistic. Every possible means should be used to preserve, as far as we may, the forests of the country, and to insure the greatest possible returns from them; but, on the contrary, it is not necessary to become greatly alarmed lest there should be an early famine of forest products.

It is probable that the per capita requirement will steadily decrease. As buildings of all sorts and in all parts of the country are being more generally built of stone or brick, and as other materials than wood enter into their construction, and as steel displaces wood, it is probable that the requirement for wood will not keep pace with the increase in our population and our industries. Still, wood will always be required, and it would be a calamity if our timber supply should ever prove inadequate.

What is needed is the preservation of our forests against fire, public recognition of the subject which will encourage forestry methods in the handling of lumber products, the replanting of areas better adapted to tree raising than to agriculture, and the withholding from absolute sale, with unrestricted right to log as the producer may see fit, such areas as still remain in the hands of the States or the National Government.

Preservative forestry methods, however, depend upon price, and those who make a great outcry against higher prices for lumber are declaiming against the only thing that can make preservative forestry practicable. The lumberman who has paid a price for his timber lands based upon the most economical and complete system of logging cannot adopt the more costly preservative methods unless the increase in the price of the product shall reimburse him therefor; but as the price of lumber advances it will be more and more practicable for operating lumbermen to use forestry methods, and it is to be hoped that this economic possibility will be realized before the time shall

come when the forests shall so far have disappeared as not to yield a sufficient supply for the markets. In fact, this time seems to be at hand, for there are many private timber owners who are now soliciting the aid and advice of the forestry division at Washington in the management of their forests.

It is stated by the forestry division that within a year the area covered by applications for making plans for forestry management has raised 1,513,000 acres to 51,192,000 acres, though this enormous increase is largely due to the efforts of the Government itself to introduce practicable forestry methods in the national reservations. But the demand for this aid on the part of private individuals is rapidly increasing all over the country. There are operating lumbermen, owners of large tracts of timber, who are contemplating the adoption of forestry methods and are soliciting the assistance of the Government.

It should be remembered, however, that the production of lumber as such is only one of the uses of wooded lands, and there is still an enormous demand for wood for fuel, and much material not suited for lumber makes ties, posts, etc. Furthermore, there is a value in forest covered areas in respect to river flowage and the retention and maintenance of water supply. Just how much this amounts to is yet unknown, but the influence of wooded areas is very important.

As an economic proposition, there is much land in the United States that will grow trees that will not profitably grow anything else, and such areas should certainly be covered by forests. To accomplish this, special legislation is necessary on the part of the States, if it is to be done by private agencies. If the man be accounted a benefactor who makes two blades of grass grow where but one did before, certainly the same principle will apply to the man who makes trees grow; but as things now stand the owner of land can ill afford to devote it to such a crop, for in most States the tax collector will see that not only does no profit accrue, but that the principal is confiscated. The promiscuous discussion of this question in the daily press, while oftentimes unreasonable and far fetched, and showing ignorance rather than knowledge, is at least arousing public interest in this important question, and has resulted in a better and fairer treatment of forestry problems.—*American Lumberman.*

We hope our readers will bear in mind the two Arbor Days, April 12th and 26th, and aid the children in making them long to be remembered.

The Commercial Side of Governmental and Private Forestry.

THE lovers of the American forest have been laboring over the forestry problem for a number of years. In the meantime, the owners of woodland have continued to solve the problem in their own way by converting trees into ready money. Only a few cases are on record in which private individuals have practiced conservative forestry,—evidently without knowing what they were doing. If we investigate into the state of affairs driving those individuals towards a conservative use of their forest holdings, we find a constellation of circumstances under which conservative use of the forest yields larger returns than forest destruction.

The most striking examples of such "unconscious" forestry are reported from the Longleaf Pine Belt in the Southern United States, a section where logging is practicable all the year round, where taxes on forest holdings used to be low, and where the pine trees, clad in a fire-proof armor of bark, are well protected against destructive conflagrations.

Obviously as long as the gigantic trees of the primeval forests cannot be approached, as long as the expense of transporting the timber to the market surmounts the price obtainable for it, the owner of the forests cannot actually practice forestry. Later on, when the country has been opened up by railroads and navigation, the cost of marketing the trees is reduced and stumpage begins to command a price. From that moment on, it will pay to use the forest. It will even pay to use it conservatively, provided that the facilities for logging are good; that the "second growth" is safe from fire; and that the accumulating taxes payable whilst the "second growth" is coming up do not devour a large percentage of the gross returns obtainable from a "second growth."

If the Government wants to encourage the movement towards conservative forestry on private holdings, it must see to it that these conditions are provided for at governmental expense. Then only forest preservation is a safe and remunerative business.

When the Government wants to have the system of railroads enlarged, it gives inducements to prospective railroad companies, making railroad investments safe and remunerative. Why should the Government hesitate to follow a similar course when the development and the maintenance of our forest resources is at stake?

Obviously, the virgin forest should not be preserved; the virgin forest is unproductive; the annual production of woody tissues is exactly offset by the annual death and decay of timber. If such were not the case, our virgin woods would get so dense in the course of the years that neither deer nor man could penetrate them.

In the well managed forest the mature trees are removed, and just that much timber is left on every acre as suffices to fully digest sunshine, rain and air,—the food of the forest.

Broadly speaking, the stumpage is cut back to that figure, at which the ratio between the annual accretion of woody tissue on the one hand and stumpage remaining on the other hand is a maximum. Where this maximal ratio prevails, the highest possible interest on the investment is derived.

Objecting to the proposition of skimming the forest by cutting its best trees, you will ask: "Does not such business-forestry interfere with the role of the forest as a regulator of drainage and navigation? Does it not cause the huge water reservoir to leak, which the forest is said to form?"

The propriety of the question cannot be doubted. We should not forget, however, that any use of any natural resource is bound to leave it in a deteriorated condition. Besides, the vegetable litter and the lumberman's debris decaying on the ground—to a much higher degree than the trees—act as a hygroscopic sponge, soaking up the falling precipitations and causing them to gradually percolate into the lower strata of mineral soil.

Remove the deep mould covering the foot of the trees—for instance by fire—and rapid surface-drainage will take the place of a slow underground-drainage. In road-building and road maintaining, striking proof may be gathered of the interdependence between run-off and soil-cover. All other conditions being equal, the road requires constant repairs, where it leads through abandoned clearings or through heavily burned timber tracts. True, the trees themselves contain a large amount of moisture. On an average, 45 per cent. of their weight is formed by water, and when burning a cord of green wood you evaporate over 250 gallons of water.

Still, the amount of water contained in the trees fluctuates within narrow limits. In a period of drought it may drop down to 40 per cent., and after continued rains it may rise to 50 per cent. What is that hygroscopity of the trees compared to the soaking power of the vegetable carpet on the ground! Experiments have shown that the weight of the soil-cover after heavy rains is increased tenfold!

Enthusiastic advocates of forestry have often deplored the disappearance of the forests from the very land where they used to grow most luxuriously. I refer to the rich land along the river bottoms. To the cause of forestry, this enthusiasm has done more harm than good. Mere common sense prescribes the rule that every acre of ground shall be devoted to that production under which it pays best. The most fertile land is justly claimed by agriculture and pasture; forestry must be properly relegated to land unfit for field crops or to a rough climate, where wheat and corn are apt to fail.

In Germany, where forestry is certainly at home, agriculture and forestry are invariably interwoven, being considered "sister and brother." The famous Black Forest is far from being an unbroken wilderness. It is dotted with villages occupying the most fertile spots. During summer the population works on the grass lands and in the fields; in winter, the forest claims all available labor.

In the Black Forest the supplies for the logging-camps are largely raised on the "forest farm," and, obviously, the "forest farm" finds a ready market for its bulky produce in the logging-camp.

In the Black Forest, a paternal Government prevents irresponsible farmers from devoting absolute forest soil to farming,—farming, of course, at a loss to the owner, and soon at a loss to the people, when the farm is found to be unproductive and is abandoned by its owner.

In this country the immigrant cannot possibly foretell what forest land, being of a truly agricultural character, should be cleared and used for farming, and what wooded tracts, under the prevailing conditions of soil, climate and means of communication, should be left to the production of timber. Some paternal supervision, some amicable foresight, must be exercised by the Government, and only such land—on the other hand all such land—must be delivered to the plough, on which farming pays better than a second growth of trees.

The question will be asked, "Does forestry pay at all?" Pointing to European or to Indian experience, the forestry scholars used to prophesy that large and rising returns can be safely expected from forestry. To the unprejudiced observer it seems strange that the American woodowner, the lumberman, is far from sharing the scholars' opinion. The American lumberman, standing in the foremost rank of successful business men, proves by the very success of his business that in this country—aside from exceptional conditions already cited—forest destruction pays better than forest preservation.

Obviously, the people as a whole, being interested in forest preservation, cannot attempt to

restrict individual rights, without compensation, for the benefit of the Commonwealth.

On the threshold of the 20th century, it would not do to simply forbid the devastation of forests owned by private individuals in the face of the fact that forest destruction is, from the merely commercial standpoint, superior to forest preservation.

If the people realize that the maintenance of the forests is a necessity for their welfare, they must be willing to spread over the entire country those—now exceptional—conditions under which conservative management of private woodlands is a safe and remunerative business.

Forestry as an investment is unsafe as long as fires cannot be prevented from destroying the forest. True, the primeval forest is fairly fire-proof. As soon, however, as the removal of the mature timber allows the sun to roast the vegetable litter on the ground whilst at the same time inflammable debris is increased, the seedlings, saplings, poles and immature trees left intact by conservative utilization of the forest are badly exposed to destruction by fire.

The virgin forest in America, and the well-managed, long-established forest which you find in Germany and France, are fairly fire-proof. The "transition forest," however, which necessarily leads from primeval conditions to those of regulated production, is very badly endangered by fires. Now, during the transition stage, is the time for action. Sixty years hence the virgin forest will be replaced by a forest allowing of regular management, if protection is carried through, or else will be replaced by barrens, if protection is denied.

For the average owner of woodlands, protection from fire during the transition stage at his own expense is practically impossible, the annual outlay being larger than the annual yield of the forest.

Only on very large, compact holdings—say tracts of over 100,000 acres—protection from fire can be effected at a reasonable expense. Still this expense, added to the taxes due annually, gradually grows up to a sum almost covering the gross receipts obtainable from a second growth in the forest.

Let us suppose, in order to clear the situation a little better, that a lumberman working conservatively has left in his forest, per acre, a young and immature growing stock of spruce scaling 1000 feet, b. m., per acre. After protecting his forest for twenty years, he will be able to cut (compare Pinchot, "The Adirondack Spruce," page 79 ff) 2000 feet, b. m., of mature timber, worth, say $3 per acre. The yearly expense of protection from fire was five cents, the yearly taxes were two cents per acre during that period of waiting. Both outlays taken together have accrued, figuring at 6 per cent. interest, to $2.57 in the course of twenty years. Thus a net yield of only $3 minus $2.57, or 43 cents per acre, is left to reward the venture.

The owner cutting slightly and working conservatively takes great risks, because he leaves a large capital exposed to destruction by fire.

The owner cutting heavily and leaving almost no seedlings, saplings and poles on the land, takes small risk. Still, in his case, the period of waiting for a second cut is so long that prospective taxes and prospective expenses consume all hope of a remunerative outcome of the venture.

Where protection from fire is absolutely assured, a second growth of trees, in my opinion, cannot be prevented from developing. Even against the wish of the owner the trees will encroach upon the cut-over land. For thousands of years, before the advent of fires, one generation of trees, in the natural course of events, has replaced the other.

Thus, if the people of this country care to engage in a far-sighted policy, if the providential functions of Government relative to forestry are understood, let them furnish laws and a salaried staff to enforce these laws by which forest fires are prohibited. Then only can we expect private forestry to be practiced, because then only will private forestry be a safe and remunerative investment.

For the Dominion and the Provinces, in their capacity as forest-owners, similar considerations hold good. Both are in the lucky position of owning large and compact tracts, so that the expense of protection, per acre of land, is greatly reduced. Both have the power to enact laws suiting the task, with a view of perpetuating the forest whilst using it. At the same time, the interest of the Commonwealth demands that no acre of virgin forest shall be touched unless the land is fit for farming, or unless the forest, during and after lumbering, is fully protected from fire.

Does forestry mean "economic stagnation?"

It certainly does not.

Forestry means "the proper handling of forest investments." Forestry intends to transform unproductive woodland into a capital yielding large revenue. The forestry investments are cut down, on the one hand, by the removal of mature timber, and are increased, on the other hand, by creating a system of floatable streams, of forest railroads and wagon roads. By these means the farms and pasture grounds—possibly the mines as well—scattered throughout the forest are made simultaneously accessible and more valuable. The investments are further increased by the expense of land surveys and stumpage surveys. Only on the basis of such surveys can a plan for further business operations—notably for railroad building—be properly draughted. In addition, fire lanes connecting the water-courses (thus joining the natural fire-breaks by artificial ones) might be made, and a system of patrol-trails might be created and hereafter maintained, invaluable in case of fires, helpful in logging operations, and welcome to hunter, fisherman and health-seeker.

It should be continuously borne in mind that the revenue which forestry means to draw from forestal capital is not necessarily made up by returns exclusively obtained through sale of timber. If it is financially advisable, with due regard to the prospect of the future, to use forest ground for forest pasture, or for farms, or for the production of tan-bark, or for whatever production (rosin, pulp, cork, rubber, fruits, game, minerals) you can imagine, then true forestry means to engage in that most promising industry, or, possibly, in a combination of several of them.

For the Commonwealth as a forest-owner, a considerable share of forestal revenue frequently consists of "pennies saved," which, if the old proverb is not mistaken, are in no way the inferiors to "pennies earned."

If by regulating, by handling the forestal investments properly, the manifold losses can be reduced, which threaten navigation, water supply, irrigation, agriculture, public health, property destructible by floods, then every penny saved by such handling and regulating is a penny legitimately earned by forestry. In other words, the gross returns from forestry practiced by the Commonwealth are not tangible goods only; the yield of the forest consists, to a large extent, of safety, of assistance, of insurance furnished to the people and to their industrial vocations.

Within the forest itself, these "indirect" blessings are scarcely ever felt. Hence the private individual owning forests does not care to produce them; the pennies saved are not saved for him.

In addition, "indirect" revenue cannot be derived from the forest in many a case without curtailing the "direct" monetary revenue. Private forestry, left to itself, cannot be expected to meet the combined tasks.

Where the private forests form a small percentage only of the total forest area of a country, no harm is done by disregarding them.

In the opposite case, the liberties of the private owner must be restricted with reference to the free disposition over woodlands (as was done in Europe some centuries), or else the owner must be continually driven by financial inducements, at the expense of the people, towards that forestal practice which makes the forest a source of direct and indirect revenue.

Whether it is not preferable for the Government to practice forestry on its own account, rather than to enter the slippery road of inducements and bounties, is a question open since Adam Smith's time. Only thorough appreciation of the economic and politic sphere of a country allows of solving the problem in a given case.

The development of Canada's gigantic forest reserve must be necessarily slow. When it is accomplished, after the lapse of another century, Canada may supply the entire world with timber. If, in the year 1750, a prophet had dared to foretell actual happenings in German forestry, he would have been laughed at by all intelligent people. At that time, square miles of forest could be bought at the price now fetched from the sale of a single oak tree standing on it.

For more remote districts, it can be historically proven that the spread of forestry abroad was closely connected with the expansion of roads and railroads. A tree (just think of the enormous mahogany trees in middle America!) has no value unless it is within reach of transportation. If a tree has little value, the seedling promising to develop into a tree after a hundred years only has practically none, and, consequently, it does not pay to put any stress on its propagation and protection.

Forestry investments, like those of railroads and insurance companies, are, as a rule, long-time investments. The forester is compelled to look far ahead into the future. In many a case, the teachings of history throw light into the darkness of coming events.

In Canada, if the population continues to increase, if the facilities of transportation continue to be developed, the price of pine stumpage, eighty years hence, might be $20 per 1000 feet, b. m.,—the price now prevailing in Germany and France. If such are the prospects, Canada will be the richest country on earth before the dawn of the next century, provided that she continues to conservatively manage her forest resources; again, if such are the possibilities, we should at once proceed to reforest every acre of ground unfit for the plough but fit for timber production.

If such are the chances, every sapling in the forest should be as carefully protected from fire as if it were a paper dollar bill.

Away with shoreless dreams! Let us return to reality. I have no time to dilate on the indirect utility of the forest—of the forest as a healer, of

the forest as a regulator of water and navigation, of the forest as an employer of the wage-earner. The indirect utility of the forest is apparently most highly appreciated where no forest exists. In the United States millions of dollars are spent for raising forests in the treeless regions, and scarcely a cent for preventing forests from losing ground on soil fit for timber production only.

No stronger argument can be proffered for govermental forestry than the present condition of the forests east of the Mississippi left helplessly in the hands of private owners. Adam Smith (who condemned State forestry 100 years ago) would quickly change his opinion if he could see conditions now prevailing in private forests, even in Germany. Conservative use, far-sighted forest policy, cannot be expected from short-lived men. The Commonwealth, an association of families formed for purposes not limited by time, is the proper owner, the most successful manager of forests.

In addition, great freedom may be given to the acts of private owners, if the far larger percentage of the forests is controlled by the people or—which seems the same—by the crown.

C. A. SCHENCK.

In many of the streets of Philadelphia the property owners have planted trees which, in some of the older sections, are quite large. It seems rather an anomaly that the city authorities have placed rows of trees on Broad Street at considerable expense, and yet allow the electric light companies, against the law, to erect poles and string wires along streets on which large trees are now growing, which will soon be entirely killed by the electric current, or their beauty spoiled; and in the cases of the silver maple, decay and ultimate death will occur if this is prevented by cutting off the upper portion of the trees.

At night one can often see the quick sharp flashes of light in the trees when the electric light wires (their protective sheathing worn off by constant rubbing) are swayed by the wind against the branches; and in case the tree is thoroughly wet from rain, any passer-by might receive serious injury if he touched the trunk at the time the current was passing down.

It would certainly seem that something might be done to protect the trees which have thus far been able to brave all the ills attendant to tree life in a city with asphalt streets, cement, stone or brick pavements, leaky gas mains, etc., and which in the summer afford grateful shade to the tired and heated public.

Pennsylvania Hemlock Output.

FOR a good many years the product of hemlock lumber from the forests of Pennsylvania has been nearly or quite 1,000,000,000 feet annually. The production has kept up such large figures in spite of almost annual predictions that a great decrease was imminent; but the time seems nearly to have come when the long predicted decrease will become a matter of fact. There are a number of causes which seem likely to bring this about. A large number of independent operators have cut out their timber holdings recently or are practically at the end of them. This leaves a large proportion of the timber in the hands of the American Leather Company, that in one way or another controls it.

It is believed by students of the subject that impending changes in tanning methods are likely to bring about a heavy decrease in the demand for hemlock bark, and that therefore the leather trust will discourage logging operations on as large a scale as heretofore, and conserve the timber so as to yield the necessary supply of bark for a longer period than a short time ago seemed possible.

It is said that the new chrome process of tanning, or rather the throwing open of this process to general use, is likely to bring about this revolution. As yet it is still necessary to use hemlock or oak bark for sole leather, harness leather, and other purposes where stiffness is required. If predictions are realized, it will practically cut the demand for hemlock and oak bark in two and restrict the lumber output of Pennsylvania hemlock, which at any time is felled with close regard to the needs of the tanning industry.

If the predictions of a heavy decrease, possibly beginning this year, in the output of Pennsylvania hemlock are verified, it will have a far-reaching effect.—*American Lumberman.*

Dr. J. T. Rothrock, the Commissioner of Forestry of Pennsylvania, will this year establish, in the State Forestry Reservations, camps where people who may be troubled with lung or bronchial affections may live out in the open air in tents, which will be provided free of charge; but the campers must furnish their own food and prepare it.

In a future issue we hope to be able to give more complete details.

F. R. MEIER,

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EDITORIALS.

THE Spring Arbor Days designated by the Governor of Pennsylvania were quite generally recognized on April 12th and 26th. Owing to the backward season, the later date was more generally observed, but there were some notable celebrations on the first-named day.

A State whose geographical limitations cover two and a half degrees of latitude and five and a half degrees of longitude, with topographical features ranging from sea-level to nearly 3000 feet above that datum, requires that more than one Arbor Day be officially declared at the season when vegetation is awakening from its winter sleep, especially if trees are to be set out.

We have knowledge of many efforts to supplement the number of trees by organizations, societies, schools, and by individuals. Possibly the last named contributed the greater number of trees, and in the future many lawns or sidewalks will be more attractive because attention was called to the desirability of planting trees by the fact that Arbor Day was instituted.

If no other good is done by the proclamation fixing specific dates as Arbor Days than to have the 6,000,000 inhabitants of Pennsylvania give a passing thought to the tree or the forest, it serves an excellent purpose, for it only requires some thought to impress upon persons of average intelligence the value of trees and the importance of forests.

But Arbor Day does more—it encourages tree-planting; and, while forest-planting cannot be done on the days named, small groves and individual trees are set out, which in the aggregate would make a forest of considerable importance, and the persons who are responsible for such planting will be interested in the future growth and development of what is planted. Such interest and attention is naturally accompanied by appreciation, and as this appreciation becomes more

general the importance of forestry is recognized by the people.

The celebration also renders signal service by impressing upon the youth lessons as to what trees are and their importance. Recitations or addresses may treat of the legends of trees, how they grow, the purposes they serve, and the importance of protecting them,—each serving a good purpose in directing young minds to start life with an appreciation of one of God's best gifts to man. J. B.

* * * * *

FOREST LEAVES prints in full an interesting and valuable decision of the Superior Court, which all owners of trees should read.

While the details of the suits brought by Dr. Marshall appeared in former issues of FOREST LEAVES, we give place to a recital of the case, and also to excerpts of the law, so as to make the matter serviceable to our readers.

Justice Beaver's tribute to the value of trees is so well expressed and so convincing that we repeat it in our editorial column: "The commercial idea that the only good tree is a dead tree—that is, that it is only good for lumber—no longer prevails. A tree has much more than a commercial value. Its influence upon climate and water-supply has come to be regarded as a question to be reckoned with in determining the conditions under which our increasingly dense population is to live and flourish. Its beauty and sightliness have value in the landscape. Its shade refreshes and shelters, and even as an investment young trees have an actual money value which cannot be disregarded or measured by their present value as timber trees. The purpose for which the property was used by the plaintiff is also to be considered. It was his summer residence, and, as such, the trees added greatly to its value. To measure the damages in this case, therefore, by the value of the young and growing trees which were cut down, under the direction of the defendant, by their value for commercial purposes, would be manifestly wrong." J. B.

* * * * *

This Spring, owing to abundant rains, there have been but few forest fires, although considerable damage was done in Blair and Somerset Counties, Pennsylvania, while large areas have been burnt over in New Jersey. The articles on "Sow to the Wind and Reap to the Whirlwind" and "Forest Fires" in this issue are particularly appropriate at this time, and hits the nail on the head.

* * * * *

The daily papers of New York City gave space to detailed accounts of the removal of trees from the territory which would be disturbed by the construction of the underground railroad. The trees specially indicated were in City Hall Park and Union Square. The same journals refer to some well advanced trees having been moved from an adjacent county to beautify the grounds of the up-town residence of a noted New Yorker.

Evidences of interest in tree preservation, such as the above, and the determined successful opposition which citizens of Germantown made to prevent the felling of an historic tree for the purpose of securing a direct pathway, may be taken as an indication of growing appreciation of the value of trees. It has been our belief, often expressed, that appreciation of individual trees encourages interest in groves and forests, and assists in forming a public sentiment favorable to forestry as a feature of National and State administration. J. B.

* * * * *

The State Forestry Reservations continue to grow apace. The land is actually acquired much more rapidly than it is possible to pass upon the titles thoroughly and safely in the interest of the State. The friends of forestry may rest assured that whilst there is very little talk about the acquisition of land, there is a deal of work going on.

* * * * *

It is sometimes well to know when not to interfere with legislation, and we think it would have been desirable had the sponsor for Senate Bill 435 considered this axiom.

In the columns of this issue of FOREST LEAVES will be found an account of the victory won by Dr. John Marshall after a protracted fight; a victory which should be appreciated by all who own or enjoy shade or ornamental trees. Having established, by his action, the validity of this law and the rights of tree owners, it appears to us that Senate Bill No. 435 has a tendency to nullify the action gained. This bill is headed "An Act making it unlawful for telegraph, telephone and electric light companies to cut or trim trees along the public highways except as may be required for the proper erection, maintenance and operation of their lines."

It provides "That from and after the passage of this act it shall not be lawful for any telegraph, telephone or electric light company, in the erection of its poles and lines along any turnpike, public road, street, lane, alley or highway in this Commonwealth, to cut or trim any trees, whether planted in the said turnpike, public road, street, lane, alley or highway, or on enclosed or unenclosed land adjoining the same, except to the extent which shall be necessary and required in order

to properly erect, construct, maintain and operate such lines, for which there shall be no recovery.

"For any wanton or malicious cutting or trimming of such trees by such companies, the owner or owners of land adjoining said turnpike or public road shall be entitled to recover double the value of each tree so improperly cut or trimmed. All laws or parts of laws inconsistent herewith are hereby repealed."

The last clause of this proposed act would undoubtedly be considered as repealing the law which Dr. Marshall showed sustained tree owners' rights, and the act leaves to employees of telegraph, telephone or electric light companies the decision as to what trimming or cutting is necessary to erect and operate their lines. We trust every true friend of forestry will use the influence he or she may have to prevent the passage of this bill by the Legislature of Pennsylvania, which, whether intended to do so or not, will evidently undo much of the good which has been accomplished through the efforts of Dr. Marshall. J. B.

Superior Court Decides that Tree Owners Have Rights.

DURING the absence of Dr. John Marshall from his farm at Douglassville, Berks county, Pa., in 1895, employees of the American Telegraph and Telephone Company cut down sixty-eight trees on his property, whereupon Dr. Marshall immediately brought criminal action against these employees, which action was carried from the court of the Justice of the Peace to the Common Pleas Court in Reading, Berks county, and thence to the Superior Court, with decisions against the telephone company throughout the entire progress of the action. The action was brought under the Act of June 8, 1881, P. L. 82, amended by the Act of June 18, 1895, P. L. 196. The fines required of the three employees of the company were to the full limit of the law, and aggregated $150.00, half of which, however, by law, was transferred to the school-board of the township in which the farm was located. The criminal suit having been decided by the highest court in favor of Dr. Marshall, he brought civil action against the company for damages, and on January 3, 1898, the court, under the Act of June 2, 1891, P. L. 170, appointed three viewers to assess damages. On February 14, 1898, the viewers filed their report, from which report the telephone company and also Dr. Marshall appealed, and on October 18, 1898, the case was tried before the Common Pleas Court in Berks county. The verdict of the jury was in favor of Dr. Marshall.* The telephone company appealed to the Superior Court, and on April 16, 1901, an opinion in favor of Dr. Marshall was handed down by Justice Beaver, allowing damages to the amount of $400.00 to Dr. Marshall. The results of the two actions, criminal and civil, brought by Dr. Marshall against the telephone company are of important concern to the citizens of this Commonwealth in that the way has now been shown, by the establishment of the constitutionality of the Acts under which the actions were brought, for any citizen of the Commonwealth whose trees have been injured or destroyed by a telegraph or telephone company to proceed criminally, and also civilly for damages, against the corporation.

Dr. Marshall is entitled to the thanks of tree lovers for his valiant fight, continued for over five years, to establish the right which a citizen has in his trees. It is evident that such a protracted struggle demanded an outlay greatly in excess of the damages Dr. Marshall received; but he single-handed continued his fight against a strong corporation, and won. Messrs. Henry D. and Herbert R. Green, his attorneys, conducted the cases in an admirable manner, taking a personal interest in them.

We append the decision of the Superior Court in full, and also the law referred to.

IN THE SUPERIOR COURT OF PENNSYLVANIA.

MARSHALL *vs.* AMERICAN TELEGRAPH AND TELEPHONE COMPANY.	No. 4 of October Term, 1900. Appeal from the Court of Common Pleas of Berks County.

Filed April 16, 1901.
Opinion by Beaver, J.

The plaintiff petitioned the court below for the appointment of viewers to assess damages claimed by him from the defendant, by reason of the cutting of trees in the erection or maintenance of their lines through his property, under the provisions of the Act of June 2, 1891, P. L. 170. Upon appeal from the award of the viewers, an issue was framed by agreement under the form of an action of assumpsit, upon which it was tried before a jury in the court below. From the judgment entered upon the verdict rendered in that case, as reduced in amount by the court, this appeal was taken.

It is to be observed that the Act of 1891, above referred to, does not in any way limit the plaintiff

* Referred to in FOREST LEAVES of December, 1898.

in his claim for damages as to the width or extent within which the cutting is done. The provisions of the Act are very general and will cover any damages which may be suffered by reason of the cutting of trees, whether planted by the roadside or on enclosed or unenclosed land adjoining the same, if done in the exercise of the right of eminent domain. If, however, there had been negligence or wantonness or unnecessary cutting, the remedy would have been trespass: Stork v. City of Phila., 195 Pa. 101; Chatham St., 16 Sup. Ct. 103. In view of this, the distinction sought to be made between what was necessary to be cut as interfering with the wires and what was done outside of the immediate reach of the wires becomes unimportant in view of all the evidence in the case which fails to show any prescribed limits for the right of way.

It is alleged by the defendant that "this case was before us in Comth. v. Clark et al., 3 Pa. Super. Ct. 141, and that, because the defendants in that case were convicted of wilfully entering upon the land of the present plaintiff and then and there wrongfully cutting down a number of ornamental trees, contrary to the Act of June 8, 1881, P. L. 82, amended by the Act of June 18, 1895, P. L. 196, which cutting was the same as that complained of in the present proceeding; and, inasmuch as the fine imposed upon the defendants in that case, as provided by the Act of Assembly, went one-half to the party or parties injured to pay for damages sustained, and the remaining one-half to the school fund of the district in which said offence was committed, the plaintiff is not entitled to recover in this action. It was said by our lamented brother WICKHAM, who wrote the opinion in that case: "Nor can we agree to the position that the Act of 1881 was repealed or made inapplicable as to the defendants and others similarly situated by the Act of June 2, 1891, P. L. 170, entitled 'An Act providing for the recovery of damages to trees along public highways by telegraph, telephone and electric light companies.' The latter Act was intended to enable land-owners to recover compensation for injuries caused by cutting of trees, under the right of eminent domain, whether exercised regularly or irregularly. The Act, under which the defendants were convicted, was intended to punish wrongdoers and deter others from following their evil example. There is no inconsistency between these statutes. Each has its proper office and can and should stand." Whether or not the plaintiff is estopped from pursuing his remedy under the Act of 1891 by reason of the fact that he accepted the one-half of the penalty imposed upon the defendants in Comth. v. Clark, as the Act expresses it, for damages sustained, might become a question, if it were regularly raised, but the record in that case was not in evidence in the court below. It is true that in an objection to the plaintiff's general offer to show the cutting on the trial of the case, it was alleged "that the record of the Court of Quarter Sessions of Berks County shows that the injury complained of, in so far as it was a trespass, was adjudicated in a prosecution by the Commonwealth against William H. Clark and others, the employees alleged to have done the injury, in which they were convicted and fined"; but this record was not then, nor was it afterwards, offered in evidence. If the admissions made by the plaintiff in his paper book had been made in the court below they might have been regarded as equivalent to the admission of the record in evidence, but, so far as the record shows, no such admissions were made at the trial, and we must dispose of the case upon what was before the court in the trial below and not upon what appears here. We can, therefore, see no objection to a recovery, as the record is presented to us, the original receipt of Wilson, the owner of the land at the time the line was originally constructed, being manifestly insufficient to cover all that was done by the defendant upon the property of the plaintiff. The effect given to it by the court was certainly all that could properly attach to it.

The only other serious question in the case is as to the measure of damages. The court admitted testimony showing the value of the property before and its value after the cutting, and submitted the case to the jury to find the damages, in accordance with the "before and after" rule. In this we think there was no error. The commercial idea that the only good tree is a dead tree—that is, that it is only good for lumber—no longer prevails. The tree has much more than a commercial value. Its influence upon climate and water supply has come to be regarded as a question to be reckoned with in determining the conditions under which our increasingly dense population is to live and flourish. Its beauty and sightliness have value in the landscape. Its shade refreshes and shelters; and, even as an investment, young trees have an actual money value which cannot be disregarded or measured by their present value as timber trees. The purpose for which the property was used by the plaintiff is also to be considered. It was his summer residence, and, as such, the trees added greatly to its value. To measure the damages in this case, therefore, by the value of the young and growing trees which were cut down under the direction of the defendant, by their value for commercial purposes, would be manifestly wrong. We know of no better rule than the one which was adopted by the court and submitted to the jury. It is true that, in adopting this rule, sentiment enters more or less into the estimate put upon the value of the trees by some of the witnesses, but it is sentiment of a substantial character which may well influence the owner or intending or prospective purchasers, and this was counterbalanced, or at least attempted to be, by the defendants, in which the difference in value based upon the use of the property owned by the plaintiff as a mere farm was given, and, of course, had weight in the minds of a jury of practical men.

The case was clearly one for the jury, and, after carefully considering all the assignments of error, and a perusal of all the testimony, we can see nothing, either in what was submitted to the jury or in the manner in which it was submitted, which would justify a reversal. Judgment affirmed.

An Act of June 2, 1891, P. L. 170,

Providing for the recovery of damage to trees along the public highways by telegraph, telephone and electric light companies.

SECTION 1. Be it enacted, etc., That from and after the passage of this act it shall be lawful, whenever any telegraph, telephone or electric light company shall have erected its poles and lines along any turnpike, public road, street, lane, alley or highway in this Commonwealth, for the owner or owners of land adjoining said turnpike or public road, who may claim to be damaged by the erection or maintenance of said lines by reason of the cutting of trees, whether planted in the said turnpike, public road, street, lane, alley or highway, or on enclosed or unenclosed land adjoining the same, to petition the Court of Common Pleas of the county in which said damage shall be alleged to have been committed, whereupon the said court shall appoint three impartial men, citizens of the county in which said damages shall be alleged, as viewers, who shall, after having been duly sworn or affirmed to the faithful performance of their duties, assess the damages done, if any, to the petitioner, and shall report the same to the court, at the first week of the next regular term thereof after the said appointment, which report shall, upon its presentation as aforesaid, be confirmed nisi; and if no appeal be entered to the same on or before ten days from the Saturday of the week in which the same is presented, it shall then be confirmed absolutely, and judgment entered by the prothonotary of the said court upon the same against the said company.

SEC. 2. The compensation of the viewers provided for by the first section of this act shall be the same as is now provided for road viewers, and shall be paid by the defendant company, where damages are awarded, otherwise by the petitioner: *Provided*, That the provisions of this act shall not apply to the police patrol or fire department telegraph lines.

Spring Arbor Day Celebrations.

THE two Spring Arbor Days, April 12th and 26th, were quite generally observed in Pennsylvania by the public schools, societies and individuals.

In Philadelphia, the Pennsylvania Society of the Colonial Dames of America celebrated Arbor Day by appropriate ceremonies of tree-planting at Stenton, the old Logan homestead. Mrs. John P. Lundy, of our Forestry Association, and Mrs. Samuel Chew, of the Committee on Historic Houses, had charge of the arrangement. Mr. Richard Wood read the Governor's Arbor Day proclamation. Mr. William S. Harvey spoke of the good accruing from the efforts of both societies in sustaining public interest in trees and historic landmarks, after which the guests assembled on the lawn to witness the planting of oaks, sugar maples, hemlocks, etc., furnished by the Pennsylvania Forestry Association.

In various sections of the city trees and shrubs were planted by school children, societies and individuals interested in horticulture. The Civic Club, assisted by City Forester Lewis, held exercises at Weccacoe Park and planted trees.

At Lancaster the Boys' High School had a long and varied programme for the day, tree-planting occupying the prominent place. This is the thirty-third Arbor Day observed by the School, and the total aggregate of trees planted is stated to have been over 5000.

At Doylestown the National Farm School held Arbor Day exercises, and trees were planted along the borders of Memorial avenue.

At Johnstown all the public schools held exercises appropriate to the day, and prominent citizens participated by addressing the scholars. The President of the Pennsylvania Forestry Association was one of the speakers at the Johnstown High School, where several hundred young men and women co-operated in making an enthusiastic meeting.

In many other parts of the State special observance of the day was made, while at Washington, D. C., where April 22d was selected, Secretary of Agriculture Wilson assisted in the ceremony of planting willow oaks, and when the first tree was

planted in honor of the late Secretary Rusk the present Secretary made an address, in which he said:

"The destruction of trees in our country has been thorough and continuous from the Atlantic westward, as population travelled, until the Pacific was reached, where our last great forest reserves are now being destroyed at a rapid rate through the agency of nearly a thousand sawmills. The pine forests of the North have been cut down, and those of the South are rapidly following. The walnuts, famous in the classics written in our language, have become so scarce that they have almost ceased to be articles of commerce. The oaks are going rapidly; only a few great reserves are left to us. This may be said of many other varieties of useful trees.

"It is our privilege and our duty to take steps for the reforesting of our country. We have gathered into our department most of the scientists of the country who have knowledge of trees. It is our intention to propagate every fine tree in America, and furnish them to the localities where they are most at home; and it is also our intention to bring seeds and plants of valuable trees from foreign countries and introduce them into suitable localities in our own. When we have thoroughly learned how to propagate the seed of each tree we shall be ready to send abroad farmers' bulletins telling the people how to do it."

Secretaries Hay, Root and Long planted trees and shrubs in the park south of the State, War and Navy Building.

In New York State the 10,251 school districts are said to have planted 229,616 trees on Arbor Day.

Dr. J. T. Rothrock, Forest Commissioner of Pennsylvania, has prepared a bill for the present Pennsylvania State Legislature to appropriate $2000 to the Hydrographic Division of the United States Geological Survey for two years, beginning June 1, 1901, for the purpose of gathering data and determining the volume and commercial value of the waters carried by the Delaware, Susquehanna and other important streams in the State. Under the provision of the bill the Geological Survey is to do the work and pay half the expenses of the investigation.

If this bill becomes a law and the work is prosecuted, the results will undoubtedly be of great value to many interests in Pennsylvania, not only to those to whom the utilization of water-power is necessary, but also to the cities and municipalities which draw their water-supply from the streams of the State.

Forest Fires.

WE present herewith two communications concerning forest fires. The first is by a gentleman who, under the name of an "Old Mountaineer," presents what he seems to think is an unknown or unappreciated method of preventing forest fires. It is a great pity that he did not sign his name to it, as it then would have carried some weight with it; for the writer is a well-known, intelligent and respected citizen of Bedford County. The signature, "Old Mountaineer," carries no weight whatever with it, because there are a thousand fallacies to which some old mountaineers are apt to cling in spite of the fact that a more exact examination of the conditions has disproven their conclusions.

Mr. Blumle speaks from an experimental knowledge of facts as they exist in a country where forestry is a science, and every statement that he makes may be depended upon. There are, however, a few facts which remain to be considered.

To Prevent Forest Fires.

A correspondent of *The Bedford Inquirer*, "an old mountaineer," makes the following novel propositions for the prevention of destructive forest fires:

First compel all owners of woodland under heavy penalty to clear their woods of all leaves and small underbrush by burning the same or otherwise removing at such times as the owners may select during the months of November, December and January, holding them responsible for any damage done to the property of others, so that proper care and judgment may be used. Of course, the first clearing of mountain and other timber land on which there may be an accumulation of leaves and brush (the product of many years) will be attended with some expense and great care; but when once cleaned nearly all care, expense and trouble will end in case all owners of woodland each and every year be compelled under heavy penalty during the aforesaid months to burn all the leaves which may have fallen from the season's growth. If this be done there can be no forest fires during the nine succeeding months; there will be nothing to burn.

When fires occur in the spring and summer time the nests of wild turkeys, pheasants, quail and other birds are destroyed, and often the birds, too, as well as young squirrels, rabbits and other game.

After the forests and groves are once cleared of all leaves and small underbrush the cost each year of burning the leaves of one season's growth will hardly exceed the cost of a box of matches. Furthermore, if done properly there can be no harm done to any young growth, as farmers know from experience that burning stubble off a field will not kill the roots of the grass. The ashes of the leaves, being left on the ground, will prove a good fertilizer, and more than enough uninjured acorns and nuts will be left to take root, where it is impossible if there be a heavy carpet of leaves. Fall fires, simply from the flash of a coating of one season's leaves, will be so light that birds and game of all kinds will scarcely be frightened, and in the months named there are no young birds and nests and no helpless animals. Nuts, too, of all kinds could easily be seen and gathered when wanted.

Let us learn wisdom from the Indians and the hunters of a hundred years ago. When the leaves were burned each fall in West Virginia and Maryland the ridges were covered with a dense growth of blue grass, affording pasture for deer and cattle. This annual fall burning had much to do in producing the smoky atmosphere which was called "Indian summer."

To Prevent Forest Fires.

Editor of The Record:

On February 20th *The Record* published an article on the above topic by an old mountaineer of Bedford, with whose suggestions I can hardly agree. In his list of preventive measures he ought to include not only the removal of all dead timber, underbrush, windfalls, etc., but the clearing away by lumbermen of all stumps, unused branches and tree tops, which might be worked into kindling-wood bundles, shingle blocks and fibre. By going through our forests on the heels of the bark-peelers, jobbers, tie-makers and other operators the old mountaineer will find, upon close examination, that hardly two-thirds of the timber cut down by the woodsman's axe has been removed. Fully one-third (in the shape of stumps, partly decayed branches, etc.) remains on the ground.

During the hot summer months said waste timber gets as dry as powder, and the first spark from a locomotive, a lighted match thrown away by a reckless smoker, or the careless burning of a fallen tree by a farmer or woodsman does damage to the extent of a hundred times as many dollars as it would have cost to remove and take care of the waste.

I was born and reared in a country where the finest forests in all Europe may be found, and where the Government spends millions of dollars for the cultivation of the woods; yet in twenty years I never saw or heard of a forest fire there. By burning the grass and leaves in the woods, as suggested by the mountaineer, not only seed, but also the warm quilt or carpet which shelters the young plants and the roots of growing timber would be destroyed. The coat of leaves and moss acts as a protection in cold and stormy weather, and likewise as a kind of receiver and retainer of rain water. I may say, without fear of contradiction, that this saturated carpet of leaves is the feeder of our springs, brooklets and mountain streams. Forest fires bring the sudden changes in our climate, cause the disastrous droughts and floods, and are great disturbers of our sanitary conditions. F. X. BLUMLE.

House of Representatives.

Notes on San Jose Scale.

AN experience of seven years with this pest, on my own grounds, should be of value to owners of trees.

It persistently attacks the Japan quince (*Cydonia Japonica*), and will not permit a specimen to live, killing the young shoots to the ground.

It attacks the Bartlett pear, and kills trees which are not sprayed with an insecticide. It speedily kills the Giffard pear. It kills young Japan plums. It attacks numerous trees, pear, apple, quince, plum, but after a time leaves them, and such trees recover from the effects of the invasion.

During an absence from home of two years, when my trees were in charge of young boys, the only specimens which perished were five Ben Davis apple trees, which had overborne the preceding year. It is observed that the parasite attacks the weaker trees and the under branches of thrifty trees. At present, in my apple orchard, it is confined to the lowermost branches, those completely overshaded. When saying that it kills trees and plants, it is desired to be understood in this way: that it requires *constant oversight*, or it will kill the varieties above named. This is more than the average person can give.

GEO. G. GROFF.

Mayor Smith, of Macon, Ga., recently inaugurated a tree-planting scheme to mature on Thanksgiving Day, and set the mark at 100 trees. It was a popular move, and as the cost was put at a comparatively low figure, the 100 mark was largely exceeded. Quite an interest was developed in the question of thus improving the streets.—*Park and Cemetery.*

Water Beech, Hornbeam. (Carpinus Caroliniana, Walt.) (Sargent, Silva N. A., Vol. IX, p. 42, t. 447.)

THIS tree is usually found on the borders of streams and swamps in moist soil; it is seldom more than twenty feet in height, or a foot in diameter, with many somewhat crooked branches. The trunk is short and thick, often somewhat perpendicularly or spirally ridged, the bark being smooth and of a blue-gray color. The wood is white, solid and strong. The leaves are oval, two to three inches long, round at the base, sharp at the tip, and toothed; the footstalk one-fourth of an inch to one-half an inch long. The male flowers hang in cylindrical scaly clusters, an inch or two long, appearing with or before the leaves. The female flowers arise from the same bud as the leaves, under a somewhat three-lobed leaf, which is less than an inch long, and covers (without inclosing in a bag, as in the ironwood) the small, hard nut.

Water beech and blue beech are expressive and characteristic names for this tree. The name "ironwood" is often given to this tree, though it should be applied only to *Ostrya Virginica*. This species ranges from Nova Scotia and Michigan to the Gulf of Mexico, and west to Kansas; it is quite common in Pennsylvania, but is not found anywhere in great quantities. The illustration shows some typical specimens growing in Chester County.

As our forests are reduced in area, the more important trees being taken and the less important left, the latter become relatively of more consequence. The wood of the water beech is well adapted to the purpose of the turner; polishes well, and may be used for cogs, pulleys, tool handles and other like work.

The specific gravity of the wood is 0.7286; percentage of ash, 0.83; relative approximate fuel value, 0.7226; weight, in pounds, of a cubic foot of dry wood, 45.41; relative strength, .22

J. T. ROTHROCK.

The red cedar of the Pacific coast is a wonder of longevity. Not only that, but they grow in the most unpromising positions and at elevations where most other trees will not grow. Here the growth is slow and they may be small, but, as Prof. Muir expresses it, "they stand out separately and independent in the wind, living mainly on snow and thin air, and maintaining tough health on this diet for at least 2000 years, every feature and gesture suggesting steadfast and dogged endurance."

New Jersey Advocates Buying All Her Forest Land.

THE State Geological Survey has submitted a proposition which will be made a public issue in the last message of Governor Voorhees, being commended to his successor and the incoming administration.

The plan, in brief, is "State forest reservations (similar to those in Germany) of territory to be acquired by condemnation and cultivated under the approved regulations of modern schemes of forestation." It is estimated that ultimately the State can derive an income of about $500,000 a year from this source, which money would be applied to the reduction of the school tax. In this way, and by means also of the income from the franchise tax on corporations, the school tax would be totally wiped out and the taxpayers be relieved of a heavy burden.

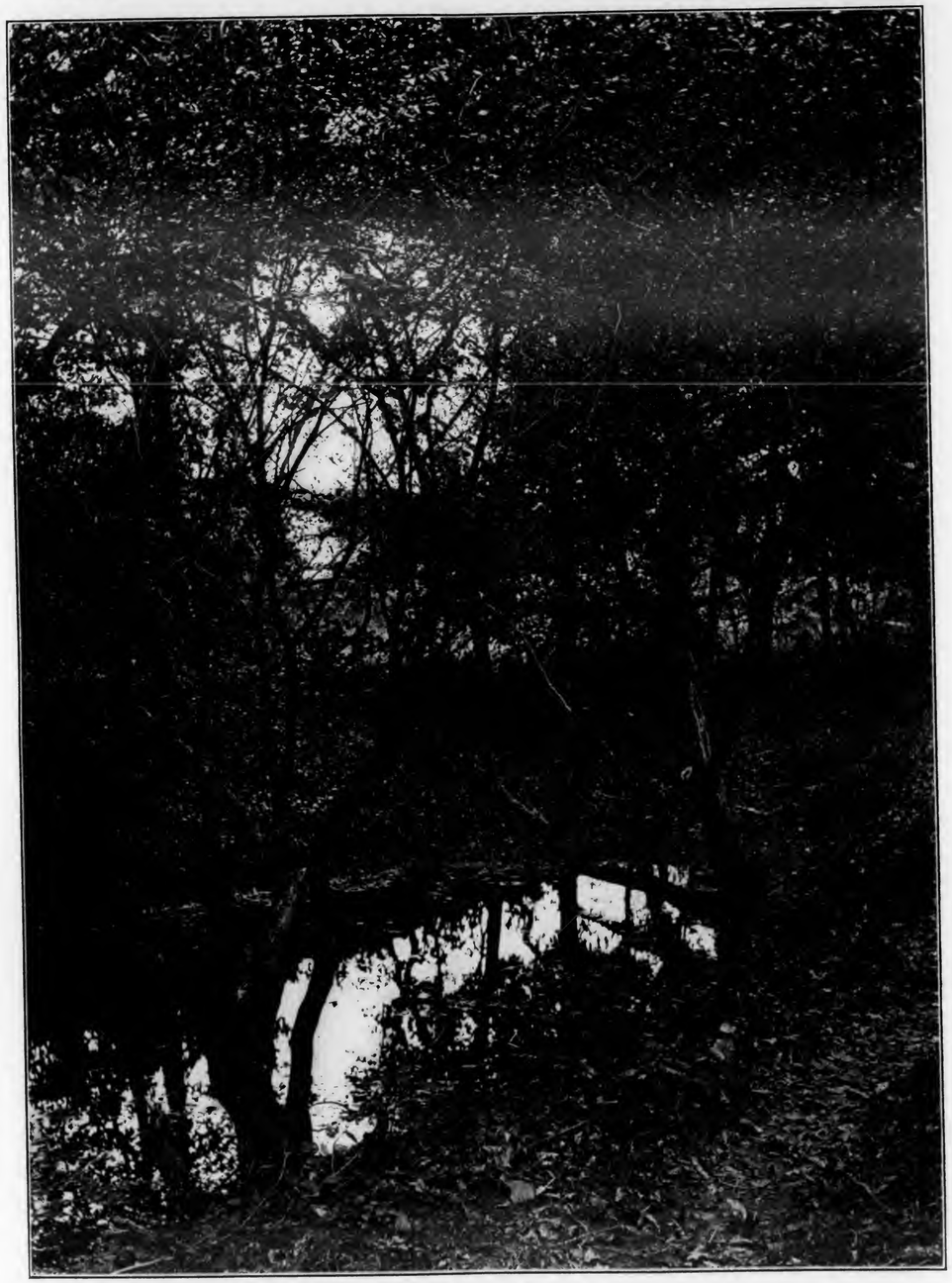
A series of articles covering every phase of the forestry question have been brought together in the last report of State Geologist Smock. The proposition is now turned over to the public-spirited men of the State, who must secure the legislative action necessary to bring the scheme into operation.

All the details of the scheme will not be laid open to public inspection until the opening of the next Legislature, but the experts without exception are of the opinion that it is eminently feasible, in support of which view they give facts and figures of vast magnitude as to the wealth of the forest of the State and its possibilities.

Little or nothing has been done in the way of cultivation of the forest by individuals and nothing by the State. In the face of this neglect the forest lands have still proven themselves valuable, which leads Prof. Gifford, himself a native of the State, to observe that "in the hands of private owners, under the circumstances which at present exist, the future of a large part of the forest land is not bright. A change of some kind is necessary, and this must come either in the form of a change of ownership or of the circumstances which fetter ownership. The only way in which the ownership may be quickly and materially changed would be by State purchase."

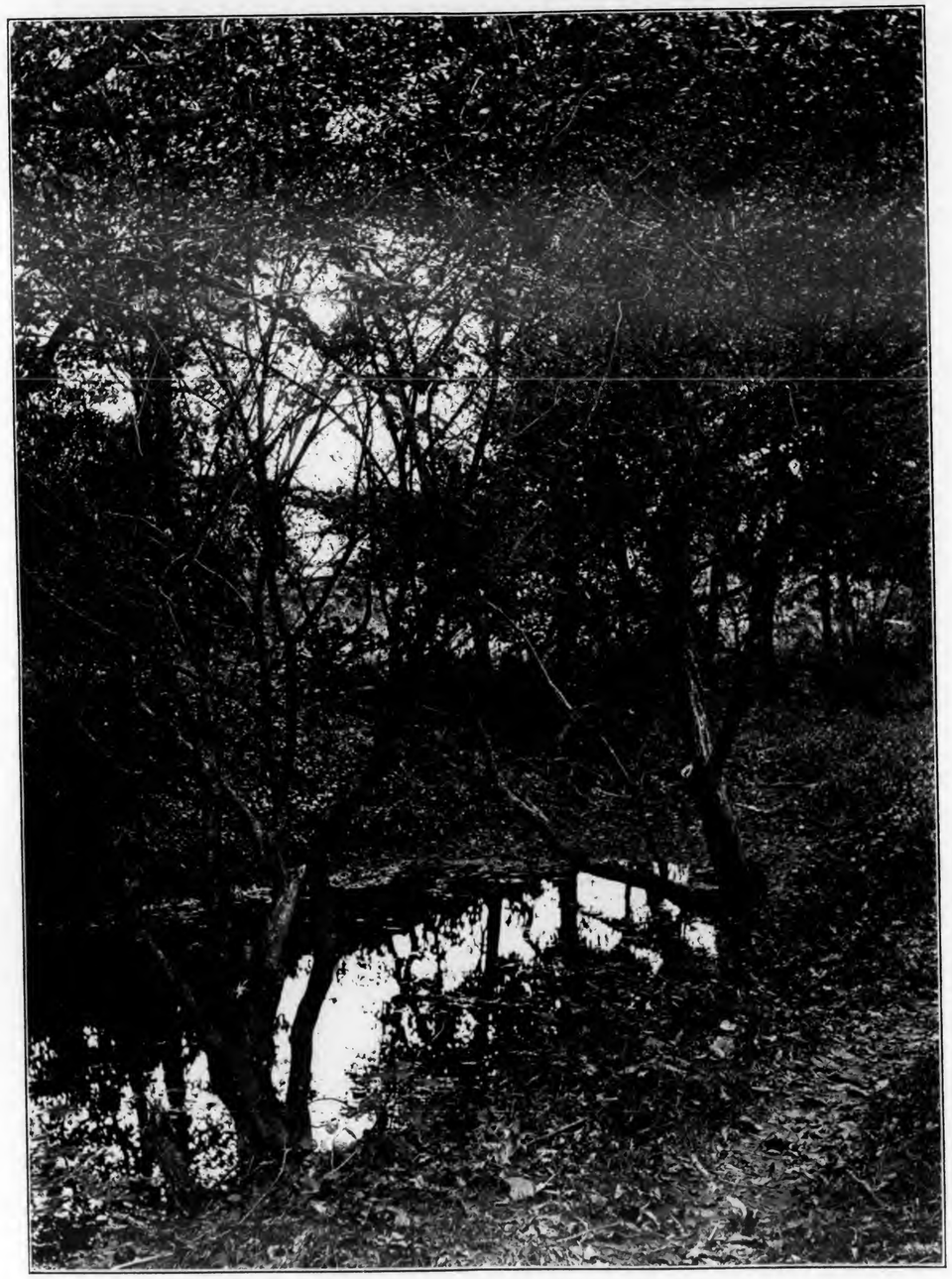
Senator Stokes takes the business view, and, while admitting the prime necessity for State ownership, both for the preservation of the trees and for scenic beauty, says that the yield of these forests should be turned into money.

The general impression concerning New Jersey forests is that they are good for kindling-wood, for the making of charcoal and bean-poles, and that the pine lands are not even worth protecting from



WATER BEECH, HORNBEAM. (CARPINUS CAROLINIANA, WALT.).
CHESTER COUNTY, PENNSYLVANIA.

TRUNK OF WATER BEECH, HORNBEAM. (CARPINUS CAROLINIANA, WALT.).
CHESTER COUNTY, PENNSYLVANIA.



WATER BEECH, HORNBEAM. (CARPINUS CAROLINIANA, WALT.).
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TRUNK OF WATER BEECH, HORNBEAM. (CARPINUS CAROLINIANA, WALT.).
CHESTER COUNTY, PENNSYLVANIA.

INTENTIONAL SECOND EXPOSURE

fire. This erroneous impression is due to the fact that landowners have known little about forestry cultivation or preservation, and never saw possibilities beyond so many cords of kindling-wood. The outside speculators have lately come quietly into Jersey, buying trees by the acre, establishing lumber camps, carrying them to the railroads, and shipping them for the telegraph, telephone and traction construction companies. The landowners were glad to accept an ordinary lump sum for all the trees of proper growth on which the lumbermen make a profit of from $5 to $10 a pole. The investigation of the Geological Survey discovered that the landowners were being defrauded and the State endangered by the reckless way the trees were being cleared. The product of the New Jersey forest now is over four millions of dollars.

Based on the collected statistics of last year, the annual value of railroad ties is $625,000; telegraph, telephone, trolley-poles and piling brought about $100,000; fuel for domestic consumption, brick and tile manufacture, $2,400,000; fencing, $365,000; logs and bolts at mills, $692,537.

The question as to the continuity of this supply is met by the testimony of the Geological Survey experts. They state if timber is cut at no more rapid rate than it is now it will last from thirty to fifty years, and that careful cultivation will have renewed the supply at the end of that time. The total value of the forests of the State is $41,259,190, the total average being $20.60 an acre, against an average of $70 an acre for improved farm land, including buildings. The proposition becomes very important when it is stated that 46 per cent., or nearly half of the upland area of the State, is in forests. Massachusetts, of the Eastern States, is the only one that has a higher average.

Forester John Gifford has given particular attention to the possibilities of South Jersey, which has 1,797,003 acres out of a total forest acreage in the State of 2,069,819. Mr. Gifford has spent most of his time in making observations in this pine belt, and he sees great possibilities for the future under the proposition of State ownership. —*Phila. Press.*

Forests, waters and prairies are the three great laboratories of nature, whence proceed all good things which ought to minister to man's happiness on earth. Forests manifestly, next to the sun, are of the greatest service; they seem to have a reaction on all the harmonies of the globe. Under the truly happy influence exercised by them everything prospers.—*Rauch.*

A Menace to the Forests.

THE decision of a Federal judge that the act authorizing the Secretary of the Interior to make regulations for the protection of forest reserves is unconstitutional, because, in effect, it delegates legislative power to an administrative officer, may be good law, but it outrages common sense, and is mischievous in its consequences. It throws the forest reserves open to the sheep men, and defeats the very purpose for which the reserves were made.

Unless regulations for the protection of forests can be enforced, the water-saving capacity of the reserves will be destroyed, and calamity will surely come to the agricultural regions adjacent. If the decision stands, Congress must legislate directly and adequately for the preservation of the forests, and do it promptly.—*The North American.*

"Sow to the Wind and Reap to the Whirlwind."

THIS spring, in Potter County, destructive forest fires have again swept over considerable areas. In some instances they were so serious and so threatening that all the available force in the neighborhood was obliged to turn out to protect private property. Sawmills were stopped and operations suspended in lumbering camps in order to furnish the force required. It was a pressing emergency. The danger was there then, and there was no doubt at all as to the damage which was being done to the individual and to the Commonwealth, nor was there any doubt as to the means to be employed to avert the calamity. But those fires had a cause; they did not start themselves. Neither spontaneous combustion nor lightning could be appealed to as sufficient reason for their existence. They came through one of three channels—ignorance, carelessness or crime.

Gentlemen of Potter County, you may expect these fires to continue until you punish the parties who start them. What are you doing in this direction? But a few weeks before this fire occurred one of the most distinguished lawyers in Pennsylvania, a resident of Potter County, saw parties driving through the woods, and wherever they halted a fire arose. He saw this several times, and the parties, when they saw they were detected, fled. Charges were brought against these men, and they were arrested. The magistrate refused even to hold them under bail. Look at this case for a moment. If the fire had occurred but once after a halt, it might have been the result of accident. But the fact that it occurred several

times removes this as a possible explanation. If it had occurred twice it might have been the result of careless lighting of cigars and then throwing away the matches, but the fact that it occurred several times removes these facts from any such explanation, and renders criminal intent the only possible conclusion to come to; and that such was the true explanation, and that the parties knew they were guilty, is shown by the fact that they fled when they were detected.

Another case in point may be taken from the action of certain authorities in McKean County one year ago, where, when a detective reported a fire to have been created by boys who were smoking out a woodchuck, the case was hooted at, and the only answer made to the charge was an inquiry as to whether or not the boys caught the woodchuck. Let us hew to the line. It matters not who these officials are, nor what may be their importance in the communities where they reside. There was either unpardonable ignorance of the laws of evidence, or intolerable impudence and neglect of official duty. It is high time that the intelligent voting citizens of this Commonwealth should realize that such officials cannot be elected except through connivance on their part. Sow to the wind, gentlemen, if you will, but do not wonder if you reap the whirlwind for a harvest.

The following bill has passed the Legislature, and been signed by the Governor:

An Act for the better protection of timber lands against fire, and providing for the expenses of the same, and directing what shall be done with the fines collected and the costs paid.

SECTION 1. Be it enacted, etc., That when the commissioners of any county or counties fail to "appoint persons under oath, whose duty it shall be to ferret out and bring to punishment all persons or corporations who either wilfully or otherwise cause the burning of timber lands" within their respective counties, as is provided for by the act of July fifteenth, one thousand eight hundred and ninety-seven, or when they have appointed inefficient persons to do the work aforesaid, the Commissioner of Forestry may, on the request of residents of a county in which such fires have been created, or on the request of the owner or owners of land which have been injured by the fires so created, appoint a detective or detectives, and employ an attorney or attorneys, to ferret out and bring to punishment, as aforesaid, those who cause the burning of timber lands; and all expenses incurred by the Commissioner of Forestry under the operation of this act shall be paid by the State Treasurer, on warrant drawn by the Auditor General, if the said bill shall be approved by the Governor and the Commissioner of Forestry; and all the fines collected shall be paid by the magistrate or by order of the court to the Commissioner of Forestry, and be paid by him to the Treasurer of the Commonwealth.

SEC. 2. When conviction is obtained, under the provisions of this act, of persons or corporations causing the burning of timber lands, then the Auditor General, on the request of the Commissioner of Forestry, may refuse to pay the State's share of the money due to the county for the services of the person or persons, appointed by the county commissioners, to ferret out and bring to punishment those who caused forest fires in the districts where such persons served as fire detectives, to make arrests and secure convictions, and for which conviction was obtained by the detectives appointed by the Commissioner of Forestry.

Approved—The 2d day of May, A.D. 1901.

WILLIAM A. STONE.

The foregoing is a true and correct copy of the Act of the General Assembly No. 86.

W. W. GRIEST,
Secretary of the Commonwealth.

The Forests of the Philippines.

THROUGH the courtesy of Major J. Biddle Porter, now stationed at Manila, P. I. (a member of the Pennsylvania Forestry Association), we have received a copy of the Annual Report of Captain George P. Ahern, in charge of the Forestry Bureau, for the year ending June 30, 1900.

We print the following interesting description which he gives of the State forests:

"From various sources of information I am led to believe that the public forest lands comprise from one-fourth to possibly one-half of the area of the Philippine Islands, viz.: from twenty to forty million acres. There are fully five million acres of virgin forest owned by the State in the Islands of Mindoro and Paragua. The Island of Mindanao, with an area of more than twenty million acres, is almost entirely covered with timber, and but a small percentage of cultivated land. In the Province of Cagayan, on the Island of Luzon, there are more than two million acres of forest. In the places just mentioned the cuttings up to the present date have been very small. In many other provinces in the Island of Luzon, especially in the country close to Manila, much timber has been cut; and to fill large contracts the lumbermen are obliged to go quite a distance from this city in order to find a suitable tract. In a recent visit to the Southern Islands of this group I was impressed with the amount of timber standing on the smaller islands; frequently the topography was such that it could be exploited with facility. I saw tracts of virgin forest where from 10,000 to 20,000 cubic feet of magnificent timber per acre was standing, trees more than 150 feet in height, and with trunks clear of branches for eighty feet, and more than four feet in diameter. There are many millions of cubic feet of timber in these forests that should be cut in order to properly thin out the dense growth; for instance, where there are three or four trees growing on a space required by one, that one so freed would put on more good wood each year than the four together. Forestry is largely a question of light and shade; it is comparatively easy to learn the most desirable tree species for a certain locality, but the question of whether 300 or 3000 trees should remain on one acre is where the real value to the scientific forester is shown.

"There are 396 tree species mentioned in the present forestry regulations. We know of fifty more growing in these islands, and each week learn of still other species. It is safe to state that the number of tree species found in these islands will be nearer 500 than 450, a great majority of these undoubtedly being hard woods. The edges of the great forests have been scarcely cut away, and fifty valuable hard woods are given to the world, the full value of which species have not been demonstrated as yet.

"There is a great variety of valuable gum, rubber and gutta percha trees, but the trade has been ruined by the Chinese in their efforts at adulteration and other fraudulent practices.

"We have a list of seventeen dye-woods, the revenue from which, if properly exploited, should pay the cost of the forestry service.

"A book has been written by Tavera on the medicinal qualities of the native plants, many trees being mentioned as possessing valuable medicinal qualities.

"The ylang-ylang tree abounds here, its blossoms producing an oil which is the base of many renowned perfumes; quite a revenue is gained by those owning these trees.

"The west slope of the Island of Romblon is a mass of cocoanut palms from the water's edge to the mountain top, every tree bringing in a yearly revenue of from one to two dollars; and when it is realized that four or five hundred such trees may be grown on an acre, one is struck with the wisdom of that former commander of Romblon who insisted upon such extensive planting of these trees. In all parts of the Southern Islands these trees seem to grow without any effort or care.

"Southern Paragua and Mindanao are celebrated for the great variety of gum, rubber and gutta percha trees grown there, but these forests have never been properly exploited, and afford a very attractive field for the investigator.

"This office is at work compiling notes on about fifty of the most important tree species, giving popular and scientific descriptions of same, with colored illustrations of the fruit, flowers and leaf of each species."

In conclusion, Captain Ahern says:

"The aim of the forester is to improve the forest until a given area produces each year a maximum of wood of the most desirable species. A careful study of the desirable species is of first importance. The undesirable species must be cleared away, and by thoroughly and scientifically exploiting any one good forest tract the great increase in value of the same will be apparent; and a policy of rational forestry encouraged in these islands, which policy in time will make these forests a source of great wealth, will afford employment for many thousand men, will make such islands as Mindoro habitable, will regulate the waterflow, and will afford ready communication through what is at present impassable and deadly jungle."

Farmers Enrolled as Protectors of Forests.

THE following statement speaks for itself plainer than anything that we could utter. So far as we know, it is the first formal denial by any respectable body of citizens in this Commonwealth of the charges made that they were interested in the creation of forest fires. And further; it is, we believe, the first time that such a body of our representative farmers has of its own free will come forward and pledged itself to aid in the suppression of forest fires. All honor to these pioneers in forest protection! Where will the next roll of honor come from?

At a meeting of the farmers of Bald Eagle and Beech Creek Townships, Clinton County, the following declaration was made:

WHEREAS, It is intimated that we, the farmers and cattlemen, are blamed for firing the forests for the purpose of our benefit,

Therefore, Resolved, That we do hereby declare our innocence from so doing, and pledge ourselves to do what we can to protect the woods from fires in the future. And, in our judgment, it would diminish the frequency of the forest

fires if the opening of the fishing season was made one month later in the spring.

Christian Myers, Flemington, Pa.
N. J. Bitner, Beech Creek, Pa.
George T. Furst, Beech Creek, Pa.
Joseph Brady, Beech Creek, Pa.
P. C. Smith, Beech Creek, Pa.
James Metzgar, Beech Creek, Pa.
Fred. C. Glossner, Beech Creek, Pa.
Leslie Cottle, Beech Creek, Pa.
Joseph Bitner, Beech Creek, Pa.
William Gummo, Floral, Pa.
J. M. A. Miller, Floral, Pa.
Adam Dickey, Lock Haven, Pa.
J. F. Myers, Flemington, Pa.
John Zeigler, Flemington, Pa.
John Kerby, Lock Haven, Pa.
James Salmon, Lock Haven, Pa.
Philip Heimer, Beech Creek, Pa.
L. M. Myers, Beech Creek, Pa.
John F. Glossner, Beech Creek, Pa.
Wm. C. Peters, Beech Creek, Pa.
Christian Robb, Blanchard, Pa.
Harry Glossner, Blanchard, Pa.
David Mapes, Beech Creek, Pa.
George H. Bitner, Beech Creek, Pa.
John B. Miller, Beech Creek, Pa.
John H. Swartz, Beech Creek, Pa.
George Peters, Beech Creek, Pa.
Oliver G. Bitner, Beech Creek, Pa.
Fred Muthler, Beech Creek, Pa.
Elmer Peters, Beech Creek, Pa.
G. M. Johnson, Beech Creek, Pa.
B. F. Rupert, Beech Creek, Pa.
James S. Masden, Beech Creek, Pa.
John B. Earon, Beech Creek, Pa.
Joseph E. Masden, Flemington, Pa.
Thomas E. Berry, Flemington, Pa.
Charles Salmon, Flemington, Pa.
W. H. Bickle, Mill Hall, Pa.
John Haagens, Beech Creek, Pa.
Wm. J. Haagens, Beech Creek, Pa.
John Peters, Beech Creek, Pa.
Samuel N. Glossner, Beech Creek, Pa.
Charles Streck, Beech Creek, Pa.
F. M. Linn, Beech Creek, Pa.
S. E. Batchlet, Beech Creek, Pa.
J. B. Linn, Beech Creek, Pa.
W. H. Osher, Lock Haven, Pa.
John E. Gummo, Floral, Pa.
M. E. Gummo, Floral, Pa.
F. E. Wren, Floral, Pa.
Warren Caldwell, Floral, Pa.
D. F. Irwin, Lock Haven, Pa.
G. W. Hasleman, Lock Haven, Pa.
C. W. Cook, Beech Creek, Pa.
Chas. E. Osner, Floral, Pa.
J. F. Crays, Floral, Pa.
Owen Miller, Floral, Pa.
Jas. F. Mantle, Floral, Pa.
S. B. Shearer, Floral, Pa.
John J. Miller, Floral, Pa.
George W. Bruer, Floral, Pa.
A. W. Mantle, Floral, Pa.
James W. Gummo, Floral, Pa.
William A. Myers, Floral, Pa.
William C. Hager, Floral, Pa.
E. G. Caldwell, Floral, Pa.
George F. Myers, Floral, Pa.
John A. Myers, Floral, Pa.
J. M. Williams, Floral, Pa.
Adam C. Earon, Floral, Pa.
G. M. Caldwell, Flemington, Pa.
Chas. E. Caldwell, Floral, Pa.

Agatized Wood.

ALMOST beautiful, interesting and decidedly unique exhibit has been set up in the Mines Building of the Pan-American Exposition. It is that of the agatized wood specimens from Chalcedony Park, Apache county, Arizona. These specimens consist of cross-sections of trees polished to a high degree of brilliancy, and showing most beautiful colors. In some of the specimens the petrified bark still surrounds the section of the tree. This petrified forest looks more like a stone quarry than a forest, as the prehistoric trees are mostly strewn around in broken sections.

The sections of trees are generally found projecting from volcanic ash and lava, which is covered with sandstone to the depth of twenty to thirty feet, and lie exposed in gulches and basins where water has worn away the sandstone. It is generally conceded that this was a tropical wood, transformed in a prehistoric era from a living, growing forest to the present recumbent sections of interblended agate, jasper, jade, calcite, amethyst, etc. Although silicified wood is found in many localities, never before was seen such variety of coloring, with sound hearts of large trees and good bark. While the quantity of material is great, the sound sections are limited, and after years of labor in selection of material fit for working, and the erection of costly machinery for cutting and polishing, it is and must ever remain a rare and costly article, since in hardness it is only three degrees from a diamond. Steel will not scratch it, nor can it be stained by ink.

Microscopical examination reveals a part of this wood to be the genus *Araucaria*, or the Norfolk Island pine of the Southern Pacific Ocean. All the specimens examined show that the wood was undergoing decay before being filled with the various media which afterwards solidified. On some of the specimens traces of fungi (mycelium) causing decay may be plainly seen. The process of petrification possibly resulted from the tree being submerged by hot geysers bearing silicon in solution, the rich oxides of Arizona intermixed with silicon, and the cell-tissues of the wood were substituted by the silicious solution and then solidified.

The Old Boston Elm.

DURING a severe gale in the winter of 1876, the ancient and revered "Great Elm" in the Boston Common was blown down. No one was in the immediate vicinity at the time, but when the elm yielded to the elements a crowd soon gathered, who immediately attacked the ruin and secured mementoes, and it was necessary to guard the tree.

For years the elm had been the chief object of interest in the historic Common. It was without doubt the oldest known tree in New England, and had seen the rise and progress of the town and city of Boston, the existence of which it probably antedates several years. Symmetrical in shape and of unusual size, the great elm was a thing of beauty. Tradition says that in early days it was a hanging tree, and it is related that in the time of witchcraft delusions Ann Hibbins met an ignominious death upon it. That was in 1656.

According to King's Hand-book of Boston, the elm was of unknown age, but was believed to have stood there before the settlement of Boston (1630).

A map of Boston, printed in 1722, found room to locate the tree, and soon after the Revolution it was cherished with pride by the citizens of Boston. It continued to flourish for half a century after independence was secured, but a great gale in 1832 did it much damage. In 1854 a substantial iron fence was placed around the tree by the city authorities to prevent acts of vandalism.

In the great gale of 1860 the tree's largest limb was torn off, and though it was restored as far as possible and the cavity filled up, the life of the old elm had received a shock from which it never recovered.

In September, 1869, the hurricane that swept away the roof of the first Coliseum building and leveled several of the Boston church spires, carried off another great branch. Since then the tree was slowly dying until blown over. It was 72 feet in height, and 22½ feet in girth one foot above the ground.—*Correspondence Providence Journal.*

New York City has become specially interested in trees, which may seem odd and tardy in a community that has persistently and disastrously neglected arboriculture. The other day a grave authority of local repute even advised young men hesitating over the selection of a profession to take up forestry as a calling in which the rewards were promising and the workers as yet few. The efforts to save the trees on the Boulevard that the excavation for the rapid transit tunnel will destroy has so far failed. The contractors are going ahead cutting them down, because the city officials, who squander immense sums on all sorts of profitless schemes, have refused to appropriate the comparatively small amount that was needed to remove and save these trees. A striking contrast to this unwise action is the course of Mr. Clarence Mackay, who is building a $3,000,000 country home at Roselyn, L. I. He is determined to preserve all the wild natural beauty of the spot—Harbor Hill, the highest point of land on Long Island—and in doing so will not allow the smallest tree to be disturbed. In order to preserve a grove of chestnuts, he had the route of the approach to the house changed, although it cost $5000 to do so. Hundreds of trees that grew in the ravines that had to be filled up were encased in boxes, at an expense of more than $20 each in many instances. When he has completed his plans he will have an estate that makes a park baronial in extent. In Brooklyn, just now, tree lovers are excited over the discovery, during the last week, of more than a hundred cases of San Jose scale. The infected trees have been carefully treated and everything done to stop the spread of the pest. Another item in this direction is a decision by the Supreme Court that property owners are entitled to damages from the owner of a horse that girdled a tree in front of a house. Both of these instances have resulted from the efforts of a public-spirited tree-planting society that a number of leading citizens have fostered in Brooklyn for several years, and which has done much in this way to beautify the city. On this side of the river there is no such body.—*New York Post.*

The Legislature of Tennessee on April 16th passed an Act giving consent to the acquisition by the United States of such lands as may be needed for the establishment of a National Forest reserve, the State to retain a concurrent jurisdiction with the United States in and over such land. This Act only applies to forested lands which lie within 20 miles of the North Carolina border. Congress is also empowered to make such laws as in its judgment is necessary for the management, control and protection of such lands.

This Act seems to be unnecessary, as the United States has concurrent jurisdiction with the States over all territory; but the purpose of the bill is evidently to further forest protection, and we therefore mention it.

New Publications.

The Fourth Annual Report of the Forest Preserve Board of the State of New York (1900) has been received. It is made up mostly of a "plain business statement" of the lands purchased up to this time by said Board, but it also gives a very interesting discussion of the conditions under which such purchases have been made. Among other things, there has been taken into consideration the "timber supply and the preservation of watersheds as related to the industries of northern New York," accessibility, means of transportation, probability of other purchasers, etc.

The Board is still hampered by small appropriations, and it is feared that delay may cause a rise in prices, making impossible the purchase of many desirable tracts. Even now lumbermen overbid the State Board, and the result is that in a few years what might have been of great service to the State becomes a barren, worthless tract. The lands purchased are in two preserves, the Adirondack Preserve and the Catskill Preserve. Of the first the present area is 1,357,576 acres, and of the latter 96,205 acres. For lands purchased before January 1, 1900, the average price per acre was $4.26+. For those purchased in 1900 the average price per acre has been $2.88+, either of which is considerably higher than that paid in Pennsylvania. About two million dollars have been spent already, and it is hoped that two millions more will be appropriated to bring the preserves to a proper size and condition. There is one very important idea that the Board tries to make clear in its report, and that is, that these appropriations are not expenditures, but that they are investments. The Legislature should be able to see this, and make its bills in view of the fact.

There is published in the report a copy of the field notes taken in the valuation of two tracts, also some yield tables of spruce and hemlock, making the report of value to local timber estimaters. GEORGE H. WIRT.

The New York State College of Forestry has just published the annual report of the Director, Dr. B. E. Fernow, for the year 1900, entitled *Progress of Forest Management in the Adirondacks*. This pamphlet of 40 pages gives a synopsis of the courses of study, the work accomplished in the forest, and what it is hoped to do.

The College forest consists of 30,000 acres of culled timber land from which the spruce and pine wood has been removed, the hard woods being left. In the cutting of this timber there is about 2¼ cords of cordwood secured to one cord of logs, and in order to obtain a market for the former a contract was entered into with a cooperage company, by which they agreed to erect a stave and heading factory to utilize the logs, and a wood-alcohol plant to use the cordwood, a contract being made for the logs for seven years, and the cordwood for fifteen years.

In cutting the timber it was found that in a sample tract of 26 acres, 5030 feet B. M. of logs and 20 cords of cordwood were secured per acre.

The question of cutting small trees is discussed, and where a 12-inch standard for logs is to prevail, it is shown that it is not good policy to cut trees below 17 inches in diameter, when at least 75 per cent. of the bole meets that standard, as otherwise the loss of material would be considerable. The average cost of logging and skidding was 17.2c., the average log containing 57½ feet.

The system necessary to be pursued in the forest is described, together with the nursery and the results secured in tree-planting.

The First Annual Report of the Michigan Forestry Commission for 1900. Lansing, Michigan, 8vo., 116 pages, illustrated.

This excellent report is really a compilation of a number of articles by well-known writers, prefaced by a statement as to the work of the Commission. The papers contributed are The Future Status and Powers of the Michigan Forestry Commission, Responsibility of the State in Providing a Business Forestry Policy, The Agricultural College and the Forestry Movement, The University and the Michigan Forestry Problem, The Interest of Railroads in Reforestation, The Pulp Industry, Forest Fires and Obligations of the State, Relation of Forests to Fish and Game, The Trespass Problem, The Economies of Modern Lumbering, Forestry and Lumbering, Waste Products of our Lumber Woods, Distribution of Rainfall in Michigan, State Tax Land Titles, Second Growth Timber, Roadside Trees and Telegraph and Telephone Companies, Forest Possibilities of the Jack Pine Plains, Relationship between Forest Growth and Character of Soils in Michigan, Forests of Michigan and Distribution of Species, Forest Succession in Michigan, Climatic Adaptation of Michigan to the Work of Reforestation, Forest Activities in Other States, and Forests and Health. It closes with excerpts from correspondence and the text of the present Michigan forestry law. It is a pity that this report should be limited to an issue of but 2000.

The Park Board of Indianapolis propose to set out in Riverton Park, this year, from 3000 to 5000 trees.

F. R. MEIER,

Consulting Forester,

MAHWAH, N. J.

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FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, One dollar.

Life membership, Fifteen dollars.

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EDITORIALS.

THE subject of forest fires is of so much importance, and demands such a liberal share of attention from those who desire the preservation of our forests, that the readers of FOREST LEAVES will require no apology for continuing the discussion upon it. We feel that in no way can appreciation of the evils of forest fires be better impressed upon the public than by the discussion of them.

Mr. Dillin defends the lumberman who leaves refuse on the ground, and pictures two ideal fire-ravaged tracts, one thoroughly cleared, the other with piles of refuse. The editor has had hard, practical experience in fighting forest fires, and this experience teaches that although the fire will traverse wherever there are dry leaves, the intensity of the fire is largely augmented by piles of tree tops or other refuse. A leaf fire is seldom a difficult problem to fight. Whipping the advancing flames with branches of brush, or possibly stamping out incipient blazes, is a very different matter from facing an advancing column of dense smoke and large bodies of flame, approach to which is impossible by reason of the intense heat. The roar which the correspondent mentions is due to the immense volume of heated air which carries strong draughts and intensifies combustion. We believe that in two tracts such as described, under similar conditions of wind, the flames would much more rapidly reach the boundaries of the one on which the *débris* remained than they would cover the tract where there were leaves only. Our correspondent also neglects the very serious influence of a protracted, intense heat, as compared with a low, quickly passing, trailing flame, on the trees which remain standing, for we assume that the ideal conditions consider that the two tracts are lumbered with a view to their maintenance as a source of supply, and not upon the theory that everything not cut is to be considered as waste.

We, however, coincide with the condemnation of the berry picker, or of any one who thus ruthlessly sacrifices his neighbor's property, and risks the possible injury to the homes and property of peaceable citizens. J. B.

* * * * *

Senate Bill 435, making telegraph, telephone and electric light companies responsible for damages for the cutting or trimming of trees along the public highways, *except as may be required for the proper erection, maintenance and operation of their lines*, to which attention was called in the last issue, with the request that the friends of forestry use their influence to secure its defeat, has perished in committee. This is a cause for congratulation, as if it had passed it would have nullified the law on this subject, by means of which Dr. John Marshall and Mr. F. J. St. John secured verdicts for tree felling and mutilation, a description of the former case having been given in the June number, and of the latter appearing in the present issue.

In this connection, a few extracts from some of the letters of legislators, referring to the request to defeat Senate Bill 435, will be of interest. One prominent member says: "I am opposed to any legislation that will affect or change the decision of the Superior Court in the two actions we have lately had." Another says: "It is useless for the State to spend money to protect trees and encourage forestry if we are to offset that good work by the passage of such a bill as Senate No. 435." Still another says: "I will do all I can to defeat the bill. I am particularly interested, as I have a number of trees along the public road which the Standard Oil Company would like to trim on account of their telegraph lines."

Another Decision in Favor of Tree Owners.

A SUIT was begun by Mr. Thomas S. Gates in September, of last year, on behalf of Mr. Frank J. St. John, the owner of a country home of some twenty-five acres situate at Penllyn, Montgomery County. The action was brought to recover damages caused by the Postal Telegraph Cable Company in cutting through some twelve or fifteen trees located in front of the St. John property, along the Plymouth Road. Some cutting of the trees, it appeared, had been done by the Company prior to February, 1900, with the consent of Mr. St. John. In that month, however, it appeared that the Telegraph Company, in order to place an additional cross bar upon their poles, cut into the trees to some considerable extent, without Mr. St. John's consent. The plaintiff, therefore, who is the executrix of Mr. St. John's estate (he having died since the suit was brought), claimed to recover from the Telegraph Company the difference in the value of the property before and after the extensive cutting in February, 1900, the contour of the trees having been spoiled to some extent. The defendants sought to escape liability, first upon the ground that most of the cutting of the trees, and the consequent damage, if any, had been done with the consent of the owner of the property prior to February, 1900, and that no additional cutting, but only an inconsiderable trimming of the trees took place at that time. In addition to this, the defendants claimed that the value of the property had not been affected by the total cutting done, irrespective of the time.

The case was tried, and resulted in a verdict for $265 in favor of the plaintiff.

Preventing Forest Fires.

THE suggestion, by a mountaineer, to compel, under heavy penalties, the owners of forest lands to clear their woods of leaves and undergrowth is very well, but the expense would be greater than people of moderate means could afford. It takes at least two men a day to clear an acre of ground of underbrush and surplus trees, leaving every sixth or seventh tree stand. This should be done in July, August and September; if done earlier the brush is not likely to be killed. Next year new growth will spring up, and this should again be cut down. The second cutting is easily done. One man, with a short scythe, will clear four or five acres a day of this young growth. After that the ground will have to be gone over again, until the tops of the trees left standing have branched out sufficiently to exclude the sun.

The raking up and burning of the leaves, as suggested by Mountaineer, is not good policy, as it deprives the trees of the covering to the roots, which acts as a warm blanket during the cold winter months. The leaves also act as a good fertilizer, and return to mother earth what has been taken from her.

Fires more or less severe devastate this region every spring and fall. From the Pocono Mountain to the Lehigh, and from there to White Haven in one direction, and to Bear Lake, Bear Creek, Five Mile Mountain, the Penobscot Range and the Nescopeck Valley in another, and thence for

miles each side of the Lehigh to Mauch Chunk, the fire fiend holds its full sway every spring and fall. This embraces an area of 520,000 acres given up to fire and devastation.

Much has been suggested to stop this wanton waste and destruction, and I venture here to repeat what I proposed last summer at a meeting of the Forestry Association, relating to the prevention of forest fires in our own State, and in all the States where forests prevail. Nearly all the destruction by fire to our forests is caused by our railroads. It is useless for us to inveigh against the railroads, for we must have them, and cannot do without them; nevertheless, the sparks from their locomotives set the woods on fire in every direction over our mountains. If you complain to the superintendent of the road he politely tells you he is very sorry, but all his locomotives have spark arresters. No doubt that is true, and the orders may be for engineers to carry spark arresters, and so far every precaution has been apparently taken; but you must take things as they are, and as they always will be, despite of what you may think they ought to be. The profit of a locomotive is in the amount of work you can get out of it, and the trainmaster attaches as many cars to the locomotive as it can possibly haul. Now, the engineer of the train has orders to be at a certain station at such a time—that means, in railroad discipline, to the minute. The engineer has a heavy grade to pull up, and has a great many cars coupled on to his train, and with that spark arrester on his draught is impeded and he can't make steam; what is the result? He either takes the spark arrester off, or else knocks a hole in it. That is the practical result. What is the remedy? Every railroad has its section boss, who has three or four men under him, to guard three or four miles of track. If the proper orders were given from headquarters for him to burn 150 feet each side of the track, the length of his section, sparks from locomotives could not set the woods on fire. There would be plenty of time in October and November to do this. It does not involve much labor, and can easily and effectually be done, and would simply amount, in a measure, like a back fire from 150 feet to the railroad track. Where there is nothing to burn there cannot be any fire. Here is an organization already established, the section boss and his men, entailing no additional expense to any one, but saving the forest from destruction throughout the length and breadth of the land. The forests thus preserved would, in course of time, bring ample returns to the railroads by increased traffic from the timber growth and product. This is the only practical method that I can conceive which would do away with the destruction of our forests by fire from the railroads, which is the principal source of trouble. It needs but an order from the president of the road.

PAUL A. OLIVER.

Correspondence.

RADNOR, PA., June 27, 1901.

Editor FOREST LEAVES:

I have read with interest the article from the pen of "A Mountaineer" upon the subject of forest fire prevention, and also the criticism upon the same subject, written by F. X. Blumle. I cannot understand why writers place so much stress upon the cleaning up of timber waste as a preventive measure against forest fires; for, so far as my observations have gone (and they have gone far), the subject of lumberman's waste is indeed one of little importance, as I shall attempt to prove in the following manner:

Let us imagine a vast tract of mountain forest. The axe and saw have been working there to such an extent that but ten acres of the virgin timber remain. This remnant lies in the centre of the tract, and a wagon-road divides it into two equal parts. There are five acres on the east side of the road and five acres on the west side; on each tract there is a heavy carpeting of leaves, for there have been no fires for a long time. Jones, the lumberman, goes to the owner of these two tracts, and he buys the one on the east side of the road. Smith, his rival in business, gets the one on the west, and cutting operations are started promptly by both. Now, Jones and Smith have different ideas as regards the cutting of timber. Jones claims that it pays to remove all offal, and orders his men to haul to his farm every twig and every chip that comes from the fallen trees. His orders are carried out to the letter, and at the close of the operation all that remains on the tract are such trees as were too small or unsuitable for merchantable lumber, together with the carpeting of leaves and leaf mold. But a different condition exists on the west side of the road, for Smith says it does not pay to bother with refuse, so removes nothing but the salable lumber, and at the close of the cutting tree-tops and other offal mark every feature of his operation. Both jobs having been concluded, the lumbermen leave for other parts.

One year after this evacuation, Brown, the huckelberry-man, who is ever alive to his own interests, chances to come that way. He views the surroundings as a beautiful berry-land to make use of, and, when convinced that he is not seen, sets fire to a dry tree-top which the careless Smith had left the year before; then, turning round, he

drops the second match into the dry leaves upon the tract of careful Jones, and hastens to a point of safety to watch operations, which are soon visible. In looking to the west he observes great volumes of white smoke rising and hears a hideous roaring of flames, for the refuse from Smith's cutting is being consumed. To the east he sees smoke, but the volumes are less dense, and are not accompanied by any considerable roaring. So much to the credit of careful Jones; but in watching the general progress of the burnings he observes the outcome to be the same—each tract is fire-swept, and both completed at about the same time, and all adjacent country to the east and to the west is aflame. Now, the reason why different conditions brought similar results can be explained in few words. Both tracts were covered with the same carpeting of dry leaves, leaf mold, pine needles, etc., and these materials surpass, as fire trailers, any other matter to be found in the woods. If any one doubts this assertion, let him make two trails of equal length, one of dry brush and the other of such matter as above described, fire both at the same time and place, and watch the finish.

To better explain my argument, I will again refer to the tract of careless Smith. Let us suppose that his was in an average condition; a pile of dry tops wherever a tree was cut—chips, slabs and brush. We will imagine that by some mysterious agency every leaf and every particle of leaf mold had been removed from this tract just before the coming of Brown, the fire-fiend. Nothing remained but the lumberman's waste upon the bare earth. Now, what success could Brown have had in firing the brush-heap? The answer is—practically none. The pile of brush would have been consumed; the fire would have extended to the limits of the pile, and no farther, as, all leaf matter having previously disappeared, connections were broken and the fire arrested. The only exception that this rule could have is where there is a continuous run of brush, which rarely occurs. Some persons imagine that a brush-heap will spread fire by throwing sparks. I grant this; but it must be remembered that leaf matter, being lighter than wood, is easier influenced by wind, and will carry farther. Either burnt twigs or leaves will leap any ordinary wood road, so it makes little difference which is in action; the results are the same in the end.

As to the burning of leaves in forests, as advocated by "A Mountaineer," I will say this: I own hundreds of acres of mountain land and much good timber; but if our State should pass a law compelling woodland owners to keep their tracts clean of leaves and brush, and, as a penalty for non-compliance with said law, the confiscation by the State or county of such neglected lands, I would say to the authorities, "You can have my property, for it will be ruinous for me to comply with legal requirements."

I will now conclude by saying that it is not the lumberman's neglect that is ruining our forests, but the character whom I have styled as "Brown." He is the terror of our woods, the plague of our nation, and acts in capacities other than berry-picker. Sometimes he supplies towns and villages with dry wood, and burns extensively; for a green woods is to him an uninteresting spectacle. Again, we find him living in a shanty back along the mountain with his numerous family; he cultivates an acre and keeps several cows running in the woods; his children are early taught that a burnt forest will produce more pasture than an unburnt one. This type is a numerous one, and is called "squatter." Then there is another variety, who burn just for a little excitement; they are also abundant. There are still others, but I shall go no further in this line, and will only add that these classes have already done incalculable damage to our country, and they mean to do more. They will burn on until afraid to ply their trade. Visions of the county prison alone will make them good, and such visions can only appear after the State has appointed for her woods a reasonable number of competent, determined men, with instructions to go there, stay there, and enforce the laws at all hazards. This good work has already been started. May it go on, for it is our only hope. To argue with such criminals is time wasted; it is like casting pearls before swine.

J. G. Dillin.

In an article in the *Iron and Coal Trades Review* Kemensky says that in the Ural district pig-iron is smelted almost exclusively on charcoal fuel, and in this respect the Urals stand first in the world, Sweden coming next. With few exceptions the manufacturing of iron and steel is done with charcoal fuel, 2,258,000 tons of wood and 1,050,000 tons of charcoal being annually consumed by the metallurgical industries.

The preparation of such a vast quantity of timber naturally renders forestry a matter of primary importance to the metallurgical industries. Besides surveying and planting the forests under their control and preserving them from robbery and fire, the works have to see to the preparation and carriage of the timber—all by manual labor.

The Urals are stated to contain 23 million acres of forests, and in the year 1900 3,223,000 cords of wood were consumed.

The Birds and the Forests.

IN the economy of nature the feathered branch of the animal kingdom and the major portion of the vegetable world are ever one and inseparable; one was created for the other; the life and well being of each depend upon the ability of its mate to protect it from insidious foes, tireless in their efforts to destroy first one and then the other.

While we are aware that upon the arid plains a few birds exist, and that some are born in the frozen, treeless, Arctic wastes and follow the billows of the sea in search of food, apparently as free from attachment to forests as are the fish upon which they daily feed, yet upon general principles, and in general terms, forests are as necessary to the well being of birds as are the birds indispensable for forest preservation.

I propound a mathematical proposition which is capable of conclusive demonstration. Given an old field, a worm fence, and a bevy of birds, the invariable result will be a hedgerow of trees and shrubs, bearing fruits and nuts, edible to the winged tribes of the locality.

The birds, creators of the forest, become also its protectors, and as a sequence their existence is maintained by the fruits of their own labors.

We view a forest: A hurricane sweeps through the wood, leveling the timber by a single blast; miles of territory are cleared of all forest growths.

Time passes: The dead trunks feed the fire which completes this work of destruction.

Nature abhors a barren waste, and in time begins the work of restoration. Birds fly across the treeless plain, bearing food for themselves and their young, and deposit here and there such seeds as compose their food. Each stump serves as a perch for one after another of these songsters; each rock and crag makes a favorite stopping-place about which numerous seeds are sown.

Then squirrels come with their store of nuts for winter use, selecting choice spots for storehouses, which become well filled, as these graceful creatures ply often from yonder nut trees to their hiding-places.

The wind blows briskly, and thickly fly the downy thistle, the cottony seeds of the willow and populus families; whirling with rapidity come the heavier winged seeds of liriodendron, ash, and maple, which, alighting here and there, bury their heads 'neath the soft mud of the water-soaked soil; farther on the lighter seeds of elm are wafted, strewing the ground as with snow.

Seeds of herbaceous plants are scattered hither and thither, as the winds and birds gather them up from the verdant spots to strew where there are none. Gently the falling leaves from the adjoining forests spread a light cover, hiding the scattered seeds and affording protection from the elements. Soon the snowflakes fly thick and fast; a mantle covers the land. As the surface is melted by the sun and frozen when night comes on, the snow crust forms an ideal playground for the wind, which, shattering the seeds from cones of hemlock, pine and spruce, drives them fiercely over the snow until they are caught by some obstacle.

Spring comes, with rains; the rushing waters overflow their banks, picking up the twigs with clinging seeds, bear them farther down the stream, and, spreading over the treeless wastes, deposit them, to sink into the yielding soil. With the warm, life-giving sunshine of Spring the seeds thrust downward their rootlets while upward reaches a bud, when two tiny leaves appear as harbingers of Spring.

And thus a forest is born. Not in a day, nor a year, for nature takes her own time and methods to accomplish her objects, yet in due time a natural forest covers the spot which accident or design had made barren. Here are beech, ash and maple, there are a clump of elms, a walnut and hickory alternating with blackberry briars and elder, hemlock with pine; trees of mammoth proportions and shrubs of low degree; ginseng, violet and twining grape strive for space to spread their roots and display their peculiar attractions.

Yonder chestnut will afford abundant nuts for boys and squirrels; these hackberries, cherries, grapes and elderberries will feed the birds which planted them; that oak may become a gnarled monarch among whose branches birds will twitter their songs of love, build their nests in safety, and feed upon its countless acorns, which, as if to acknowledge its dependence upon the birds and small animals, it supplies in such abundance.

Certain birds plant nuts and acorns with systematic regularity, burying them 'neath the surface, one in a place, expecting ere long to find its food, either from an enclosed egg, which in time become a fat, luscious worm, or else the meat of the acorn.

In Arizona the blue jays gather the pine nuts and bury them singly at a depth of an inch or more in the arid sands. Here they are preserved for months, or until the snow has fallen and melted, moistening the seeds. In this manner the pinon is planted.

The wild cherry, but for its tasty, juicy berries, as also the hackberry, would soon become extinct, or at least confined in narrow limits, but for the birds. Their seeds have no wings to be borne by the winds; they do not readily float upon the stream; they would simply drop to the ground

and spring up in thickets directly beneath the parent tree. But when devoured by birds they are distributed far and wide, the seedlings taking root wherever a tree or rock or fence permits a bird to perch. Thus they are perpetuated and extended to various portions of the globe.

The aromatic seeds of the juniper or cedar will only germinate under conditions of heat and moisture such as are found in the crops of fowls; the shell, being too hard for the enclosed germ to open, hence would fall to the ground and perish for want of moisture but for the birds.

The wild apple, pear, and pulpy fruits are similarly transferred to distant points, thus ensuring the perpetual propagation of such trees.

The beech with its savory nuts, as also chestnuts, chinquapin and other small nuts are borne to hiding-places for food by birds and squirrels, while an ample share find their way to the ground, forming new forests.

The cross-bill, with its peculiar mandibles, opens the cones of pines, extracting the seeds, of which it is fond, and distributes many in flight.

Birds often practice the art of grafting. The mistletoe of Christmas-tide, living as a parasite upon the branches of large trees, has clusters of small white berries which contain the seed. These are transferred from branch to branch by adhering to the bill; the bird pecks into the bark to remove the seed, which thus become engrafted into the tree.

Are the birds disturbed in the wood? So also the forest is constantly harassed by enemies which menace its destruction.

Age and decrepitude are common to trees as to animals; their existence terminates in decay. Were it not for nature's army of birds, aided by their allies, the squirrels, many sorts of trees and plants would become extinct.

Boring insects penetrate the bark and wood, existing upon the sap of growing trees, and, unless held in check by hungry birds, multiply rapidly and eventually destroy the forest.

Destructive bark beetles become so numerous as to completely girdle large numbers of pine trees. They live upon the cambium which forms the connecting tissues of bark and wood; their burrows encircle the trees and prevent the sap from ascending to support the foliage, which withers and dies.

Woodpeckers, whose instinct excels the marvellous X-rays, discover beetles beneath several inches of overlying bark, and, boring through, thrust in their long tongues, drawing out beetles and larvæ.

In an official report made to the Commissioner of the Land Office of my visit to the Black Hills forests, I stated that in one tree eight inches in diameter we counted and estimated 10,000 beetles and larvæ. The bark came off in sections, having been entirely separated from the wood by the insects. There were no woodpeckers, and few other birds, and one-third of the forest was dead.

Aphides suck the juices from leaves and tender stems; a horde of worms infest the buds, devouring the vital organs of trees; birds are always on the alert; hungry, they awake at early dawn to breakfast upon these enemies of the forest. Impelled by hunger they continue their labors all the day, gathering in the flies, mosquitoes, bugs and worms, thus keeping them in subjection.

One battalion hovers around the conifers in search of beetles; other scouts seek those enemies which curl the leaves and feed upon the juices; a regiment is kept on special service as snake and vermin destroyers; a large brigade is on duty watching for mice in the open fields by night, returning to the forest during the day. In this way owls and hawks earn that living which human kind denies them, but shoot upon all occasions.

In return the forest affords shelter for the birds; their nests are built among the branches, hidden by leafy canopies from the intrusion of numerous enemies and sheltered from storms.

It is natural for all animal kind to seek seclusion at times; nesting places are sought, safe from view; only in the thick woods can perfect security be found. Here insects abound, berries, fruits, nuts and oily seeds are in profusion; happy is their lot. Small birds without the forest have little chance for their lives, where animals of the cat tribe or birds of prey have every advantage.

With the disappearance of the forests bird food is insufficient; they are driven to the fields and slaughtered. The balance in nature being destroyed, insects increase immoderately, and are driven to feed upon orchard and domestic trees in our gardens. So additional burdens are placed upon the husbandman, who unwittingly contributes to his own misfortunes.

Fifty years ago the San Jose scale, codling moth, woolly aphis, plum curculio, and a host of pests now so common, were not known, or gave so little trouble as not to attract attention, while fruits of all kinds were abundant where there were trees.

Surely no one can imagine that these pests were created during the past half century; not all of them were imported from countries which had centuries ago cleared away their forests. No! they were intended to be kept in subjection by nature's laws, which invariably preserve a balance.

Destruction of forests reduces the number of birds, and, naturally, insects multiply as a result.

Protect the birds; increase the forests, and insect pests will gradually cease their annoyance.—JOHN P. BROWN, in *The Conservative*.

Australian Forests.

THE importance of forest conservation is beginning to receive increased attention in Australia, where the revenue from the State forests remains considerably below that obtained in countries possessing far less wealth of timber. In New South Wales, according to Mr. Coghlan, forests, contrary to the popular idea in Europe and America, extend over almost the whole area of the State, excepting portions of the Monaro, the Lachlan, the Murrumbidgee districts and the trans-Darling region, where extensive treeless plains occur, clothed with salt-bush, scrub, or species of natural grasses. The country covered by timber may be divided into three classes—open, brush, and scrub forests. The first of these cover the greatest portion of the surface of the State, and are found in every formation. The trees met with are chiefly species of Eucalyptus, Angophora, and other genera of the order Myrtaceæ. The prevalence of the eucalypti, and the large extent covered by the forests, give the country a rather monotonous aspect; but the park-like appearance of the open forests, and the beauty of the many flowering shrubs, win admiration in spite of the sameness of the trees; while even the dull, greyish blue of the foliage of the gum trees, when relieved by the yellow blossoms of the wattle, including the graceful myall, or the beautiful and shapely kurrajong, is not without its attractiveness. The trees are, for the most part, straight and cylindrical in the trunk, and when full grown, their first branch is a considerable height from the ground. The roots of the eucalyptus often lie at no great distance from the surface soil, an adaptation of nature to the peculiar climatic conditions of the country. The finest specimens of most of the timber trees, those yielding the most valuable timber, are found on ridges and hill-sides, in places frequently too rough and stony for cultivation. This circumstance is in many ways fortunate for the State. In the course of settlement, when the rich plains are denuded of their trees, and when scarcity will make timber more appreciated than it is at present, land not adapted for agricultural settlement will still be available for the cultivation of the finest trees. Amongst the many trees of commercial value, immense specimens of red gum and apple trees, on the northern river flats, mark the course of the streams; while on the ridges and mountain sides other species predominate, such as the white or she-ironbark, narrow-leaved ironbark, broad-leaved ironbark, mugga or red ironbark, blackbutt, white mahogany, tallow-wood, spotted gum, grey box, red mahogany, grey gum, forest red gum, and Sydney blue gum. Neither must turpentine, one of the most beautiful trees of the State, nor the brush box of the northern rivers, a tree much in request for ornamental purposes, be forgotten. The brush forests cover a large extent of country along the coast. The trees found in them differ entirely from those of the open forests, and there is no lack of variety either in the character of the trees or the color of their foliage. Tall, graceful fern trees, sometimes attaining a height of 60 feet, beautiful species of palms, cabbage trees, and Moreton Bay figs of enormous proportions are prominent features of the northern brushes, though these are perhaps more ornamental than useful. There are, however, found in the brush forests timber trees of the greatest value. Among these may be mentioned the red cedar, and its close allies, rosewood and red bean, three of the most valuable woods of the State; beech, a valuable, little shrinking wood, now getting scarce; colonial or hoop pine, a soft wood, not of the best quality; brown or berry pine, which resists white ants and other timber pests in a marked degree. Besides the timbers mentioned, there are worthy of note the silky oak, the red silky oak or beefwood, tulip-wood, flindosa or cudgerie, native teak, blueberry ash, maiden's blush, red ash, corkwood, and many others too numerous to mention. The character of the vegetation of the brush forests alters considerably according to the latitude. The trees of the genera *Araucaria* and *Flindersia*, as well as cedar and its allies, find a home chiefly in the northern parts of the State, while many of the trees growing in the south have no representatives in the northern forests. The soil of the brush lands is wonderfully fertile, consisting as it does of decomposed volcanic rocks, enriched by the accumulation of decayed vegetable matter, and when cleared it yields an abundant return. The scrub forests are found in the poor soils, principally in the Lachlan and Darling districts. The chief genera represented are the pines, and multitudinous species of acacia and eucalyptus; but although some of the trees are of great beauty, they have little commercial value. The most uninviting portion of the State is covered with scrub, and the mallee districts, clothed as they are with stunted timber—species of eucalyptus—impress the traveller more unfavorably than would even a barren waste. The varying character of the forest country in New South Wales readily explains the conflicting accounts of visitors, each of whom simply describes what he saw, accepting it as representing the whole.

JOHN PLUMMER.

Sydney, New South Wales.

Black Haw. (Viburnum prunifolium, L.)

THIS little tree is sometimes called popularly, here, Nanny Berry, which name, it is thought by some, belongs more properly to the *Viburnum Lentago, L.*

The black haw is by no means uncommon in Pennsylvania, where it sometimes attains a height of thirty feet.

So far as I am aware the tree is of but little commercial importance, though one can readily suppose, from its hard and heavy wood, that it might, and may yet, be utilized.

It has a reputation in certain forms of disease, though probably its value even as a remedy is not very great or very well established.

The blue-black pulpy fruit is eaten by boys, who are tolerant enough to say that they enjoy it.

Mountain Ash. (Pyrus Americana, DC.) (Sargent, Silva N. A., Vol. IV., p. 79, t. 171, 172.)

A SMALL tree, native of the cooler parts of the United States, and reaching south into the higher regions of this State. It seldom attains a height greater than thirty feet, or a diameter of more than one foot.

The leaves are compound, of from eleven to fifteen leaflets, which are lance-shaped, usually sharp-pointed, with teeth toward the point, and clustered on the ends of the branches. The flowers appear in June, and are small, white and clustered.

The fruit is a berry, red or orange-colored, in clusters, which in autumn form the most striking feature of the tree, and one that adds much to its value as an ornament.

The young bark is bright green, becoming darker with age. The branches are few, making ordinarily a sharp angle with the stem. The wood of the heart is brown, and of the sap almost white, and of no special value in the arts.

Its physical properties are: specific gravity, 0.5451; percentage of ash, 0.83; relative approximate fuel value, 0.5406; weight in pounds of a cubic foot of dry wood, 33.97; relative strength, no figures, but the strength is not great.

The mountain ash is subject to the attack of several species of borers.

Mr. J. G. Dillin gives the following information in regard to a large pin oak located at Llanerch, Delaware County. It is 21 ft. 4 in. in circumference 14 ~~feet~~ inches above the ground. The tree seems to be perfectly sound and well proportioned.

The Forests of Nicaragua.

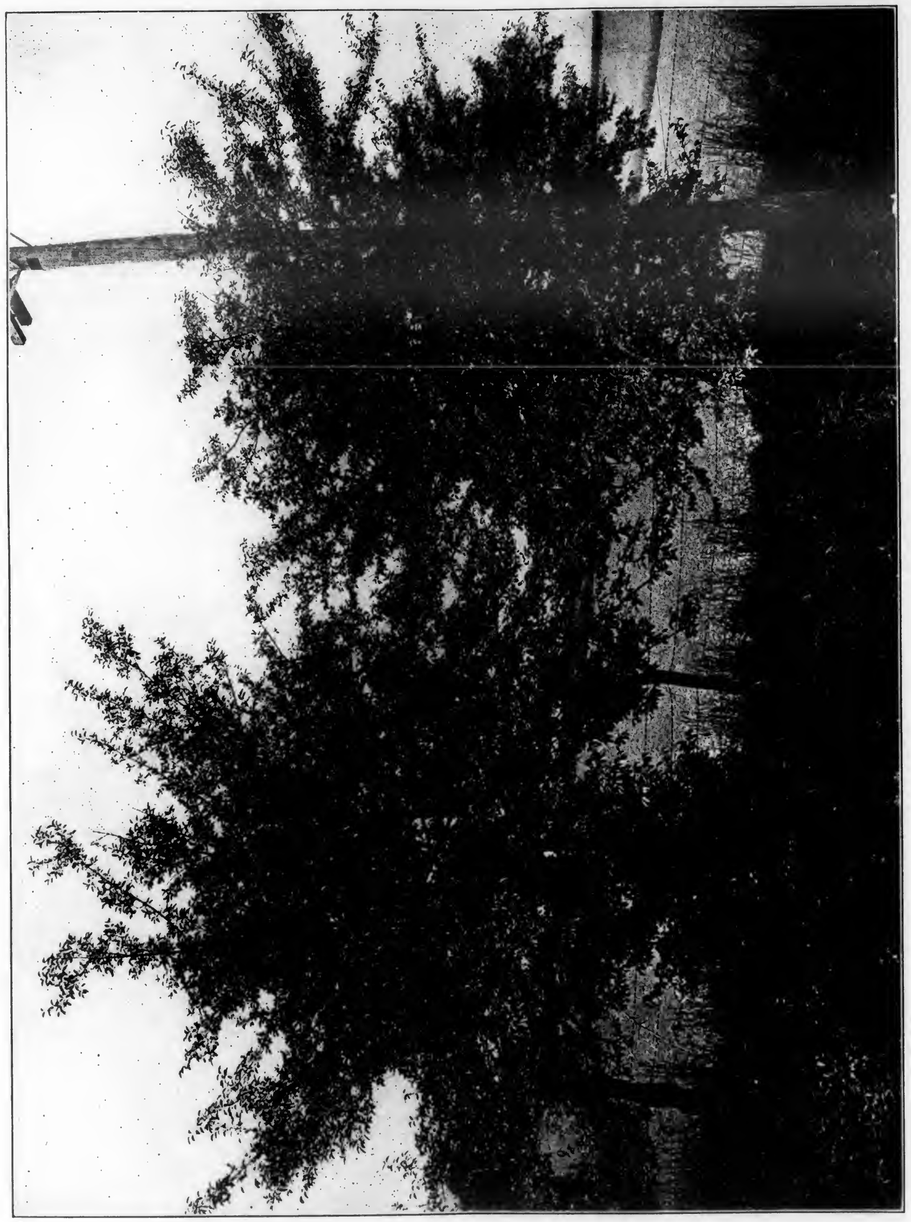
DR. GUSTAVO NIEDERLEIN, Chief of the Scientific Department of the Philadelphia Commercial Museum, has prepared an excellent hand-book entitled "The State of Nicaragua of the Greater Republic of Central America." It contains much valuable data, but our readers will be most interested in a description of the forests of the country.

Passing inland from the low, swampy Atlantic coast are found large savannas with forests of pine and palms. Further west the ground rises into foot-hills, and the rapids, here called *raudales*, are reached, and steam navigation ends. Here the savannas cease, and a different forest, denser and higher, with fewer vines, begins. An evergreen virgin forest, dark and beautiful in the variety of its vegetation, often with pacayas (*Chamaedorea Pacaya Oerst.*) and tree-ferns (*Asophila aculeata Swartz.*) underneath, covers the now broken and hilly lands on which the humus often attains a depth of four feet. Here also is found in abundance the Central American rubber tree (*Castilloa elastica Cerv*).

In this region the rivers are only navigable by small boats. Here and there are seen the houses of lumbermen who deal in caoba (*Swietenia mahogani L.*) and cedar (*Cedrela odorata L.*), or the huts of the *huleros* or the extractors of rubber. The shores of the rivers become higher, their currents run faster, and their courses are more tortuous. Very soon points are reached where even canoes must be left behind. The alluvial soil long ago gave place to laterite, a reddish clay of great fertility. The forest now becomes still higher and darker and its trees straighter. Innumerable creeks cross the valleys and cañons. Very often the naked porphyrous and melaphyric rocks of the mountains are seen, sometimes also the basalts, trachytes and andesites of older formations. Here the temperature is milder, and during the night it is rather cold. In the morning there are fogs, and in the afternoon frequent showers and thunder-storms occur. In this region grow the caoba, cedar, ron-ron, almendro, posan, lagarto, palo de arco, plomo, laurel, as also rubber and hundreds of other kinds of trees and useful plants. The same region furnishes abundant nourishment to hundreds of birds.

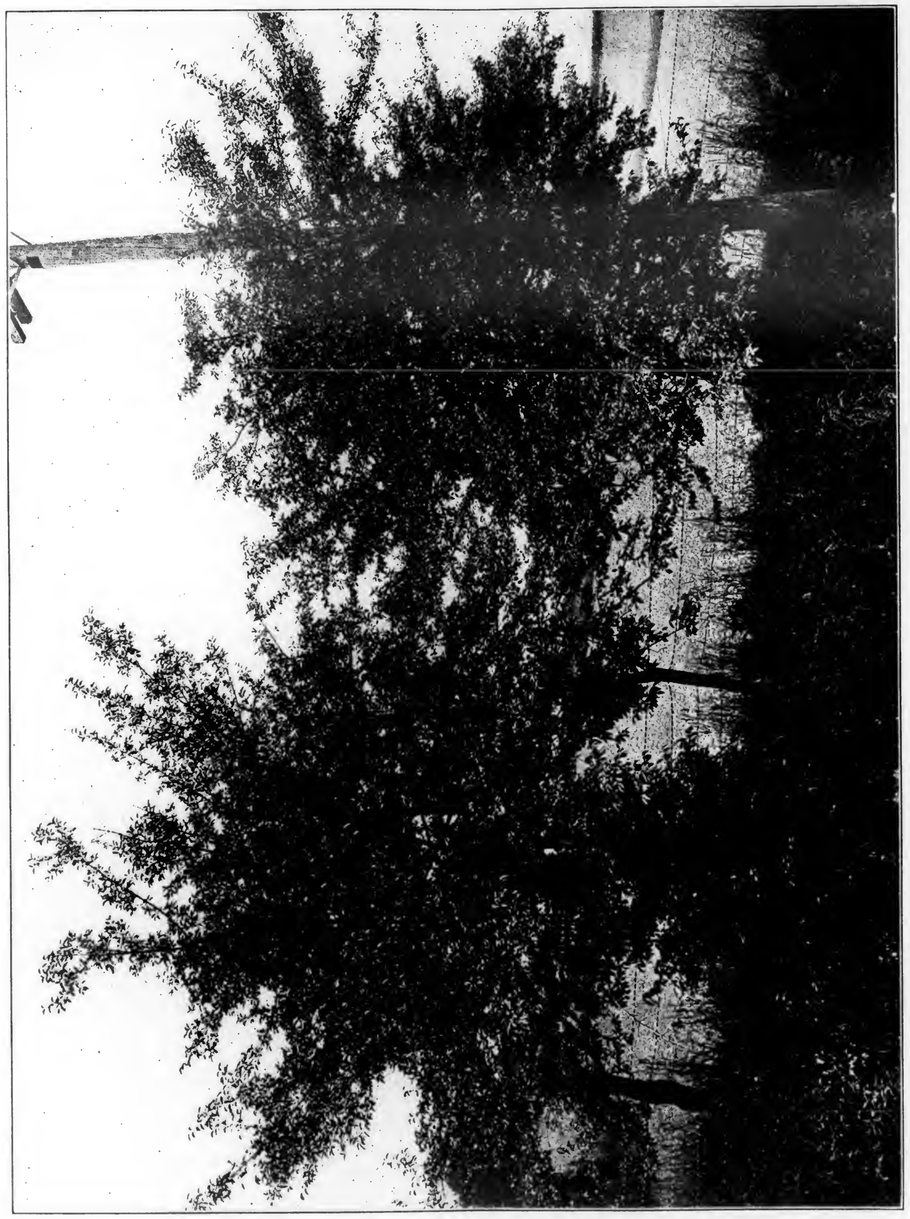
When the dividing-line is passed, from a region of cloudy and rainy skies suddenly one of sunshine is reached, from the virgin forest to an *ocotal* (pine forest) and *roblares* (forests of oaks).

As the dividing mountain range is abruptly broken, so are the changes of climate and vegetation. The change from a virgin forest to an



BLACK HAW. (VIBURNUM PRUNIFOLIUM, L.).
CHESTER COUNTY, PENNSYLVANIA.

AMERICAN MOUNTAIN ASH.
(PYRUS AMERICANA, D.C.).



BLACK HAW. (VIBURNUM PRUNIFOLIUM, L.).
CHESTER COUNTY, PENNSYLVANIA.

FOREST LEAVES, VOL. VIII., NO. 4.

AMERICAN MOUNTAIN ASH.
(PYRUS AMERICANA, D.C.).

INTENTIONAL SECOND EXPOSURE

ocotal is often so sharply marked that the border line between them can be distinctly traced and even measured off, as with a surveyor's chain.

There is a great difference in climate and vegetation, as there is in the landscape. We left on the other side the immense but uniform, evenly covered and slowly descending slopes of the Andes. Here before us we have a chaos of mountains, hills, valleys, plains, lakes, volcanoes, etc., which represent one of the greatest of terrestrial convulsions. Near by we seem to behold a solidified furious sea; farther down we observe the vast plain with splendid lakes, and then the majestic line of volcanoes, whose summits generally wear a cap of clouds; still again we see the cities, towns and villages built on the shores of the lakes, on the slopes of the mountains and on the plains of Leon and Chinandega. Finally, beyond this watershed of two great oceans, lies the vast Pacific.

The character of the country changes, as has been already mentioned, very suddenly toward the terrace lands. Here the mountains are covered with pines, and lower down with oaks (robles). There are pine forests, as for instance near San Rafael, which are over 30 miles in length and about 6 miles in width, and crossed by a number of rivers. The pines often mingle with the oaks, although the oak prefers a better soil. These trees cover the lower sides of the mountains and the slopes at their feet.

Descending the dividing ridge, now mostly covered with pines and oaks, we note that the virgin forests have ceased, and we are more in the region of rocks and scenes of volcanic energy.

Everything around shows the proximity of the volcanoes which did such tremendous work farther down. The mountains and hills are no more clad with dense forests, as on the other side. Only here and there are seen small islands of forest trees and two narrow strips of lower trees along the banks of the rivers which flow to the lakes. The ligneous vegetation consists more of *matorrales* (low trees and bushes), and there are more grassy than wooded lands.

Coming down to the llanos of the first terrace we find them often surrounded by "roblares." The plains are broad, but mostly swampy, forming the so-called *jicarales*. They have a dark clay soil in which in summer time tremendous fissures open. As they are covered with grasses they are used for pasturage, and only for agriculture where a creek has mixed the clay with sand. The hills and mountains are stony, but covered with oaks, matorrales and small trees, also with cacti, agave and bromelia.

Leaving the slopes of the first terrace and coming down to warmer lowlands, we encounter a belt of forest containing numerous species of trees densely covered with vines and climbing plants; and now we stand before the lakes. In the larger, the Great Lake of Nicaragua, beautiful islands are embosomed. The flat lake valley has generally a much better vegetation than that of the just described Andean slope. The hills are covered with forests and the plains contain a great number of *potreros*, or grassy lands mixed in an irregular way with trees and bushes, on which cattle browse. Here and there also are "jicarales," but, with a few exceptions, of less extent than those already described. In many places the land is cultivated. The prevailing trees are pochote (*Bombax macrocarpum K. Sch.*), guacimo (*Guazuma ulmifolia Lam.*), guabillo (*Inga sp.*), guanacaste (*Enterolobium cyclocarpum Gr.*), elequeme (*Erythrina corralodendron L.*), chilamate (*Ficus sp.*), guarumo (*Cecropia insignis Liebm.*), espino, madroño (*Calycophyllum candidissima DC.*), and jocote (*Spondias lutea L.*). The most common plants are a kind of verbesine, a kind of spiranthes and a species of sida. Very abundant is also the piñuela (*Bromelia*), which is generally used for fences.

Along the Pacific coast the little rivers discharge into swamps, and the vegetation is composed mostly of mangrove and icaco. Here also grows the *cocales*, though less abundantly than on the Atlantic side. Inland "jicarales" occur in many places. In Chinandega are immense swamps facing the Gulf of Fonseca. There are also many valuable forests along the river courses or depressions.

A table of the native names of 429 trees is also given.

Forest Preservation.

IN an article in the New York *Saturday Evening Post*, under the head of "Business Combinations for Farmers," by ex-Secretary J. Sterling Morton, is the following wise and sensible paragraph concerning the preservation of our forests:

The Vital Importance of Forests.

The whole future of agriculture is vitally dependent upon arboriculture and forestry. The reckless destruction of the groves and forests of the United States threatens utter infertility to all parts of the Union. More than twenty-five thousand acres of trees are cut down in the United States, and made into railroad ties, lumber, furniture, and other commodities, every twenty-four hours. Among seventy-five millions of people,

even this vast destruction of trees gives a very small per capita portion of wood or lumber.

The interdependence of tree life, vegetable life and animal life is constant. Unless forests are conserved and trees planted, all farming must perish within the next hundred years; and should the whole globe be denuded of forests and groves, all animal life would become extinct. The intermission of tree life and growth throughout the world for a single summer would extinguish all animal life. Teaching tree-planting at home, about the fireside, and practicing tree-planting on all the farms in the United States, are pressing necessities. Self-preservation should inspire every American to do all in his power to promote arboriculture. Agriculture everywhere must lend a helping hand to the tree-planters. It is time to plant trees and begin the partial renewal of the forests of the continent, if we care to leave to our posterity a habitable country.

The Forestry Bureau.

THE establishment of the Forestry Bureau as a feature of the National Department of Agriculture has met with much favor from the public press, many editorials giving unmeasured endorsement to this action. In this FOREST LEAVES heartily joins, and gives to Chief Pinchot its enthusiastic support.

Forestry is no longer esteemed a fad, it is recognized as a necessity, and the government has given its stamp of approval by the creation of the bureau. We merely note two of the comments made by the press. Many others could be added to indicate that the action of the Department of Agriculture has the support of the people.

The Philadelphia *Press*, in speaking of the subject, says:

"Forestry in the United States has met with little or no active opposition, but it has had to overcome the passive inertia of popular ignorance. No thinking man fails to admit that the woodlands of America are of value to the country, yet he hears of a fire which destroys some vast tract, comments upon it as upon a piece of news of purely momentary interest, and promptly dismisses the matter from his mind. Wood and water still are abundant, and an annual loss estimated at $50,000,000 is therefore regarded as inevitable, even if not taken for granted. Within a year a single fire stripped 6500 acres in California, and cost the best of $20,000 before it was extinguished, but it is to be doubted if one man in ten thousand gave it serious thought."

An editorial in the *Public Ledger* states that "One of the encouraging signs of the times is the wonderful growth of popular interest in forestry, and the influence which the wider knowledge of the importance of the subject is having upon the movement to preserve the great natural forest wealth of the country against the inroads of waste, carelessness and wanton destruction. When President Cleveland issued his order extending the area of the national forest reserves, the protest made by cattlemen, mining interests and lumbermen, who were wasting the forests of the national domain, was so strong that it seemed likely to stay the progress of forest preservation. In the meantime information about forestry has been diligently and persistently spread abroad, and the people in the districts from which formerly the strongest protests came against preserving forest lands are now said to be among the most eager to get bills through Congress extending the area of parks and reserves. The change is also apparent in Congress. The popular demand for safeguarding the national forest wealth is so strong that Senators who were formerly inclined to take the view of the mining camps, cattle kings and voracious lumbermen, do not find it expedient to oppose the popular opinion. With the beginning of the present fiscal year, July 1, 1901, the Forestry Bureau of the Department of Agriculture went into operation for the first time, and will hereafter do the work previously confided to a division. Year before last the Congressional appropriation for forestry was $28,520; last year it was $88,520, and for the new fiscal year the sum is $185,440. Three years ago the working force in the Forestry Division was eleven, while the Forestry Bureau now has 179 employes. There are now about 47,000,000 acres in forest preserves, and the work of extending the domain will undoubtedly go forward with rapidity. The annual consumption of lumber in the United States amounts in value to about $800,000,000, or as much as the total mineral production of the country. The object of the Forestry Bureau is not only to preserve certain tracts of forest land, but to teach the importance of intelligently safeguarding the forest wealth. Within recent years 20 per cent. of the merchantable timber of the State of Washington has been burned. As it is estimated that 114,000,000,000 feet are standing, enough has been wasted through carelessness to supply the whole United States for two years."

Olives are cultivated in 33 provinces of Spain, the most extensive groves being in Jaen, Cordoba and Seville. A total of 2,851,106 acres are thus employed, and the average yearly production is valued at $30,000,000.

The Administration of the United States Forest Reserves.

THE United States now has 38 forest reserves, with a total acreage of 46,828,449, and the work in this field is now divided among three bodies: the General Land Office, which is charged with their administration; the United States Geological Survey, to which falls the duty of mapping and describing them; and the new Bureau of Forestry of the Department of Agriculture, which is called upon to investigate questions of a scientific and technical nature. The Department of the Interior, in addition to these, includes an organized force of rangers to prevent forest fires, and Secretary Hitchcock now plans to add to his department a bureau which will carry out plans for the protection and extension of forests in the United States, modeled after the German and other foreign systems, but an improvement on them. He says that existing legislation and the funds at his command will permit of the inauguration of such a system.

The Secretary has in mind to have the cutting of timber conducted under the intelligent supervision of agents of the department. He would remove first the dead and down, and thin out overwooded portions of the reserves. Then he would have a system of reforestation, the object of which would be to replace the trees removed as rapidly as practicable.

The Supply of Timber.

DR. W. SCHLICH, formerly Inspector General of Forests to the Government of India, in an address before the Society of Arts, London, England, discussed the possibility of a failure, at no distant date, in the world's timber supply, and a *résumé* taken from the London *Standard* is of interest.

Dr. Schlich said that to answer this question three others must be asked. Taking the world as a whole, is the demand materially increasing? If so, is the supply keeping pace with it? If not, can any remedy be found? The prospect of such a famine is no trifling matter. We are accustomed to discuss with some misgivings the probable curtailment of the national coal supply, but the world at large need not concern itself with such apprehensions. A deficiency in timber, however, is more imminent and hardly less serious. Apart from its use for fuel and building, it has been in demand for making paper pulp and cellulose. In Europe, thirteen countries are importers, Great Britain being the head of the list, followed by Germany, with France as the third. Five are exporters, Russia and Scandinavia being the leaders here. In Europe, as a whole, imports exceed exports by over 2,600,000 tons. The demand also is increasing.

In the British Isles imports have grown during the last thirty-five years at an average rate of 139,000 tons, and the price has mounted yet more rapidly. Germany, though it has extensive forests of its own, supporting by work done in them about a million people, and three times as many by work in connection with them, is also a large importer, though it takes less than half as much as England requires. Dr. Schlich calculated that the consumption of timber in the four chief consuming countries, at the present rate of increase, will probably have risen in a few years from 14 to 20 cubic feet per head.

Among the exporting countries the forest area is extensive in Russia, and especially in Finland, but from a variety of causes is not capable of very great expansion, so the supply of timber may not improbably begin before long to fall off. In Scandinavia the limit of productity seems to have been already reached. Dr. Schlich passes other regions in review. Some of them are importers, but their demand is far exceeded by the export of the rest, the balance on that side amounting to 2,285,000 tons, or less by 335,000 tons than the European deficit. This, however, is made up by imports from such countries as Madagascar, Siam and Java, which do not figure in the tabulated return. It is clear, then, that the supply, even at the present time, can barely keep pace with the demand, and the limit of the former has been very nearly reached. China, if it becomes prosperous, is more likely to import timber than to export it, for she has little of her own.

The United States hitherto have been large exporters, the average value of timber sold exceeding that bought during the last fifteen years by over £2,500,000. But Dr. Schlich maintains that, notwithstanding the vast area covered by forest, and the productive measure now adopted, the States could not long support a greatly increased demand. The position in Canada is still worse. The waste has been proportionately greater in the past, and measures to check it are only in the germ. Dr. Schlich, therefore, concludes that, so far as coniferous wood is concerned, the danger of deficient supply is already almost at hand. In England this constitutes 87 per cent. of the imports, and the price is steadily, though slowly, rising. What remedy, then, can be found? Dr. Schlich replies: Cultivate timber on waste lands, like other crops on the more fertile soil. There are in this country 25,000,000 acres

suitable for the purpose. A quarter of this area would make Great Britain self-supporting in the matter of timber, and would give employment to thousands of its population.

One of the benefits of forest reserves is as a source of water supply for storage reservoirs, and Mr. Gifford Pinchot, Chief of the Forestry Bureau, says:

"Such reservoirs fail either through the giving way of the dams — a remediable calamity — or through the filling up of the reservoir with silt— a misfortune of a totally different kind. Storage reservoirs whose drainage areas are not protected by forests stand in the greatest danger from this source. Silt is the chief foe to irrigation, and the only remedy is the forest."

The water from these reservoirs is used for irrigation purposes, and much arid land made highly productive.

Dr. H. S. Anders read a paper on "The Necessity for State Aid in the Treatment of the Consumptive Poor," before the joint meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, instancing the establishment of free hospitals and sanatoriums for consumptive poor in European countries.

Osler estimates that there are over 1,250,000 cases of consumption in the United States at all times—one person in 50 is afflicted with tuberculosis. The disease kills 4½ times as many people as smallpox, scarlet and typhoid fevers and diphtheria combined. In Pennsylvania there are about 20,000 cases, with about 5000 deaths from this disease alone. Roughly stated, in a group of cities, with an aggregate population of about 10,000,000, in 1897 there were a little more than 20,000 deaths from tuberculosis, or a death-rate of a little over 20 per 10,000 people. About one in 520 persons in Philadelphia die of consumption, while in McKean County, Pa., only one in 1300 so dies.

In 1898 Pennsylvania appropriated $843,800 for general hospitals, only $18,000 of which was distributed for the 12 most healthful and finely forested counties, where for sanatoriums alone one-half the total of that general hospital appropriation might and should be expended for the tuberculous poor.

State aid is needed, and would facilitate much, because the best climatic advantages for sanatoriums are often in many of those regions where State forestry reservations are maintained.

New Members of the Pennsylvania Forestry Association.

SINCE the October issue the following persons have joined the Pennsylvania Forestry Association:

Acker, Mrs. Finley, 4943 Rubicam Ave., G't'n, Phila., Pa.
Ahlers, William, Box 204, Allegheny, Pa.
Anders, Howard S., M.D., 1836 Wallace St., Philadelphia, Pa.
Bacon, Thomas P., Jenkintown, Pa.
Benson, Mrs. R. Dale, 1120 Spruce St., Philadelphia, Pa.
Biddle, Mrs. Edward W., Carlisle, Pa.
Blatchley, Walter F., 401 Chestnut Lane, Wayne, Pa.
Bogle, J. Norris, Howard, Pa.
Brodhead, Robert P., "Wheat Plains," Delaware P. O., Pa.
Brown, Samuel B., Haverford, Pa.
Brown, Mrs. Samuel B., Haverford, Pa.
Brune, Miss Blanche S., Stevenson, Md.
Castle, William H., 4241 Walnut St., Phila., Pa.
Cheyne, J. A., Pittsburgh, Pa.
Clay, Mrs. Harry G., 1734 Pine St., Philadelphia, Pa.
Coales, Mrs. Edward, 1734 Chestnut St., Philadelphia, Pa.
Comegys, Miss Mary E., 4205 Walnut St., Phila., Pa.
Cooper, J. Cardeen, M.D., 1016 Lehigh Ave., Philadelphia, Pa.
Crawford, Andrew W., 701 Stephen Girard Building, Phila., Pa.
Davis, Miss Helen M., Old York Road, Station G., Phila., Pa.
Dickson, Mrs. S., 901 Clinton St., Philadelphia, Pa.
Drexel, Mrs. Lucy Wharton, Maud, Pa.
Egbert, Prof. Seneca, 4814 Springfield Ave., Phila., Pa.
Esherick, Mrs. E. A., 323 S. 12th St., Philadelphia, Pa.
Fahy, Thomas A., 1609 N. 10th St., Philadelphia, Pa.
Flanigan, William A., 36 S. Front St., Philadelphia, Pa.
Forrest, Mrs. Molton H., 2000 Spruce St., Phila., Pa.
Gemmill, Miss Margaret J., 1325 Arch St., Phila., Pa.
Goodrich, H. G., 2004 Green St., Philadelphia, Pa.
Goodrich, W. C., 332 Walnut St., Phila., Pa.
Grant, Mrs. Samuel, 1026 Spruce St., Philadelphia, Pa.
Grove, Jeremiah H., 27 N. 3d St., Philadelphia, Pa.
Grubb, Miss Hannah R., 4222 Walnut St., Phila., Pa.
Gubbins, Charles H., M.D., 1635 Race St., Phila., Pa.
Gucker, Frank T., 3420 Hamilton St., Philadelphia, Pa.
Guilloû, Victor, 615 Walnut St., Philadelphia, Pa.
Gunther, Mrs. E. S., 2016 Locust St., Philadelphia, Pa.
Hacker, Caspar Wister, 421 Chestnut St., Philadelphia, Pa.
Haines, Mrs. Mary Rhoads, Rosemont, Pa.
Haldeman, Donald C., P. O. Box 418, Harrisburg, Pa.
Hamersly, Edmund G., 1001 Chestnut St., Phila., Pa.
Hance, Joseph C., 1719 Spring Garden St., Phila., Pa.
Hancock, John C., 3201 Arch St., Philadelphia, Pa.
Hare, Emlen S., Strafford, Pa.
Haydon, Miss Mary, Jeanesville, Pa.
Heppe, Mr. Florence J., Cresheim Road, Germantown, Phila., Pa.
Heston, Dr. Geo. T., Newtown, Pa.
Howe, Frank P., 251 S. 17th St., Philadelphia, Pa.
Howell, George R., 2128 Pine St., Philadelphia, Pa.
Houston, Mrs. H. H., "Drum Moir," Chestnut Hill, Phila., Pa.
Iredell, Lrs. Robert JrI, Allentown, Pa.
Jeanes, Joseph Y., 311 S. 15th St., Philadelphia, Pa.
Jordan, William, Morris and Logan Sts., G't'n., Phila.
Keating, Miss E. E., 315 S. 16th St., Philadelphia, Pa.
Kelly, Miss E. W., 144 W. Lehigh Ave., Philadelphia, Pa.
Kendig, Rev. Daniel, 1932 Spruce St., Philadelphia, Pa.

Ketcham, Stanley R., 1610 Real Estate Trust Building, Phila., Pa.
Krebs, Fred., Johnstown, Pa.
Lambert, Miss Helen, 330 W. Johnson St., Germantown, Phila.
Lee, Franklyn A., 404 Betz Building, Phila., Pa.
Leedom, Joseph, 15 N. Juniper St., Philadelphia, Pa.
Lesley, Mrs. Robert, 1500 Spruce St., Philadelphia, Pa.
Lippincott, Mrs. Agnes Dundas, 1333 Walnut St., Philadelphia, Pa.
Lippincott, Miss Caroline, Wyncote, Pa.
Lloyd, John, Altoona, Pa.
Lloyd, Mrs. Malcolm, "Brinklow," Villa Nova, Pa.
Lowber, Miss E. W., 2045 Chestnut St., Philadelphia, Pa.
Madeira, Miss, 1337 Pine St., Philadelphia, Pa.
Marshall, George Morley, M.D., 1819 Spruce St , Phila., Pa.
Martindale, Thomas, 413 N. 33d St., Philadelphia, Pa.
Mather, Mrs. Charles E., Haverford, Pa.
Meehan, S. Mendelson, Dorset St., E. Chew St., G't'n., Phila., Pa.
Metzger, E. Louis, 1903 Spring Garden St., Phila., Pa.
Miller, Miss Isabel, 705 Locust St., Philadelphia, Pa.
Mitchell, John K., M.D., 256 S. 15th St., Phila., Pa.
Moore, Clarence B., 1321 Locust St., Philadelphia, Pa.
Muñoz, Mrs. A. C., Main St., Chestnut Hill, Phila., Pa.
Musser, J. H., M.D., 1927 Chestnut St., Philadelphia, Pa.
Muzzey, Frank W., 1803 Chestnut St., Phila., Pa.
McAllister, Miss Eliza Y., 3503 Baring St., Phila., Pa.
McDonnell, Mrs. M. G., 3804 Locust St., Phila., Pa.
McIlhenny, John D., 252 W. Johnson St., Germantown, Phila.
Norris, George W., Penllyn, Pa.
Page, Louis, R., 115 S. 19th St., Philadelphia, Pa.
Palmer, Alfred P., 307 Walnut St., Philadelphia, Pa.
Paschall, Mrs. Alfred, Doylestown, Pa.
Paschall, Irvin F., Doylestown, Pa.
Patterson, T. H. Hoge, 4231 Walnut St., Philadelphia, Pa.
Pechin, Miss L. S., 243 S. 13th St., Philadelphia, Pa.
Peters, Mrs. Richard, 1101 Spruce St., Philadelphia, Pa.
Peterson, Arthur, 5924 Woodbine Ave., Overbrook, Pa.
Pile, Charles H., 1616 Summer St., Philadelphia, Pa.
Potts, H. W., 422 S. 42d St., Philadelphia, Pa.
Reeves, Francis B., McKean Avenue, Germantown, Phila.
Reighard, James Gamble, Williamsport, Pa.
Reyburn, John E., 1822 Spring Garden St., Phila., Pa.
Riley, Lewis A., 108 S. 4th St., Philadelphia, Pa.
Ritchie, Craig D., 414 N. 34th St., Philadelphia, Pa.
Rowland, Harvey, Jr., Frankford, Philadelphia, Pa.
Rumney, Rev. Theodore Sill, 6000 Wayne Ave., Germantown, Phila.
Russell, Henry C., 4106 Westminster Ave., Phila., Pa.
Scattergood, Alfred G., 3515 Powelton Ave., Phila., Pa.
Scheel, I. Thompson, M.D., 2505 N. 17th St., Phila, Pa.
Scott, Edgar, 1830 Rittenhouse Square, Philadelphia, Pa.
Scott, Mrs. John, 3808 Chestnut St., Philadelphia, Pa.
Serrill, Wm. J., Haverford, Pa.
Sherman, Charles P., 1011 Chestnut St., Philadelphia, Pa.
Shoemaker, Mrs. Joseph M., Locust Ave., Germantown, Phila., Pa.
Simons, John F., 134 W. Coulter St., Philadelphia, Pa.
Smith, Charles C., 3908 Chestnut St., Philadelphia, Pa.
Smith, L. I., Jr., 3908 Chestnut St., Philadelphia, Pa.
Snare, Mrs. Sarah E., 2002 N. Broad St., Phila., Pa.
Sower, Chr. G., 1926 Arch St., Philadelphia, Pa.
Sterling, Miss Emma M., "Drumpeller," Coatesville, Pa.
Stevens, Mrs. Anna M., 1914 S. Rittenhouse Square, Philadelphia, Pa.
Stewart, E., Sup't. Forestry, Dep't. Interior, Ottawa, Canada.
Stroud, Mrs. Julia D., 5830 Drexel Road, Overbrook, Phila., Pa.
Sulzer, G. W. F., Rochelle and Freeland Aves., Wissahickon, Phila., Pa.
Tafel, Mrs. Anna A., 3306 Arch St., Philadelphia, Pa.
Taylor, Nathan A., 303 Branch St., Philadelphia, Pa.
Thomas, Charles Hermon, M.D., 3634 Chestnut St., Philadelphia, Pa.
Thomson, Mrs. Caroline, 61 School Lane, G't'n., Phila.
Turner, Mrs. C. P., 1506 Walnut St., Philadelphia, Pa.
Van der Wielen, Adolf B., 3339 Walnut St., Philadelphia, Pa.
Watkin, Miss Katharine, Box 379, Bryn Mawr, Pa.
Weber, Frederick, 120 Sumac St., Wissahickon, Phila., Pa.
Weigley, W. W., 1015 Stephen Girard Building, Phila.
Welsh, Francis Ralston, 328 Chestnut St., Philadelphia, Pa.
Wistar, C. Cresson, 5355 Knox St., G't'n., Phila., Pa.
Willard, DeForest, M.D., 1818 Chestnut St., Phila., Pa.
Wood, Miss Helen Biddle, 1016 Spruce St., Phila., Pa.
Wood, Mrs. Randolph, N. W. Cor. 21st and Chestnut Sts., Phila., Pa.
Yarnall, Charlton, Haverford, Pa.
Zug, Charles K., The Newport, 16th and Spruce Sts., Phila., Pa.

Italics indicate life members.

Books Received.

Sylvan Ontario, a Guide to the Native Trees and Shrubs of the Province of Ontario. By W. H. Muldrew. 68 pages, 8vo., illustrated, bound in flexible leather. Published by William Briggs, Toronto, Canada. Price, $1.00.

In this book Prof. Muldrew gives descriptions of how to distinguish a tree by detailed observation of its leaves, and the stems of leaves, with examples, and a leaf index, closing the work with a list of the woods of the Province of Ontario, giving the botanical and common names, together with a short description of each, the whole being illustrated by 131 leaf drawings. This book aims in a popular manner to enable any one, by a study of the leaf, to differentiate and name the tree to which it belongs. It is bound in such a way that it can be readily rolled up, put in the pocket, and taken into the woods.

Sixth Annual Report of the Forest Fire Warden of Minnesota, 1900, St. Paul, Minn. 8vo., 138 pages, illustrated.

General C. C. Andrews, in his report for the year 1900, first calls attention to the fire warden system. He says that "the spring of 1900 was the driest season that has occurred since 1894. The number of forest fires reported in 1900 was 139, which burned over 179,521 acres, and did damage to the amount of $153,399. The number of prairie fires was 50; acres burned over, 213,240; damage, $63,017.

"In a number of instances a great amount of property was saved by the efforts of fire wardens. The area in which forest and prairie fires are

liable to occur in Minnesota exceeds thirty million acres, and it may be presumed that some fires occurred in the unsettled territory not covered by fire warden service."

Instances are given of the value of the fire warden system, and it is stated that in the six years it has been in operation the damage from forest fires, according to the reports from fire wardens, has averaged only $35,000 a year, while the forests, at a conservative estimate, are worth one hundred million dollars.

Attention is called to the cutting of good growing pine timber under the "dead and down" timber law, the latter offering a premium for starting forest fires.

An interesting estimate is given of the present marketable timber, and it is stated that probably there are twenty billion feet of pine still standing in Minnesota, principally in the counties of Cook, Lake, St. Louis, Itasca, Cass and Beltrami. There is still some left in Carlton, Pine, Kanabec, Millelacs, Aitkin, Morrison, Crow Wing, Todd, Hubbard and Becker. There remains much cedar, spruce, balsam and tamarack, immense quantities of poplar, and an extensive supply of other deciduous woods. Most of the land which naturally bears coniferous forest, such as the pine, is unfit for agricultural purposes. And herein is the significance of forestry for the people of Minnesota, that the pine will earn, by its growth, a net income on the capital it represents of three per cent. compound interest on refuse land—land that is too sandy, or too hilly, or too rocky for profitable cultivation.

General Andrews recommends an amendment to the constitution, which should be heeded; it is as follows:

"Land which is unfit for agriculture, and on which forest is systematically grown in good faith on tracts of not less than forty acres, shall be exempt from taxation; but the forest crop on such land shall be taxed according to its value when it has reached merchantable size; and the tax shall be a lien on the land. *Provided*, That any land on which the branches and tops of felled trees shall remain after six months from the time the trees were felled shall be assessed and taxed as other land is assessed and taxed."

A considerable portion of the report deals with statistics in regard to forest cultivation in a number of European countries, showing the large revenues obtained by good administration.

Thirteenth Annual Report of the City Parks Association of Philadelphia, 1901. 60 pages, 8vo., illustrated.

The annual report states that during the year but one addition has been made to the city's park area, this being a small triangle at the Spring Garden Street entrance to Fairmount Park; but considerable work was done in improving spaces heretofore set aside as parks, seven in various sections of the city being opened up to the public.

Since the Association was formed 17 parks have been selected and improved, 5 more are being improved, and 10 selected, adding a total of 473 acres to the park area of the city, which now amounts to 3990 acres. This is certainly a creditable showing for the Association, and one of which it may justly feel proud. If the plans of the Association can be carried out, it will give the City of Philadelphia one of the finest park systems in the world.

A Forest Working-Plan for Township 40, New York State Forest Reserve, Bulletin No. 30, U. S. Dep't Agriculture, Division of Forestry, by R. S. Hosmer and Eugene S. Bruce. 8vo. 64 pages, with maps and illustrations, which was made at the request of The Forest, Fish and Game Commission of the State of New York.

This brochure is preceded by a discussion of Conservative Lumbering and Water-Supply by F. H. Newell. Mr. Newell states that if proper care is used in conservative lumbering, the upper summits and steep slopes being left uncut, and forest fires kept out, that the water-supply will not be affected to any extent.

Township 40, in Hamilton County, N.Y., has an area of 25,660 acres, nearly all of which is owned by the State of New York, and contains Raquette Lake. It is covered by a virgin forest of mixed hard and soft wood, the latter predominating, and the township has been unusually free from damage by fire. It is well timbered, there being a heavy stand of mature spruce, also pine and balsam, which should be cut.

Under the plan proposed, the beauties of Raquette Lake will be maintained by leaving belts of reserves along the shores of the lake and of Marion River. The total merchantable area recommended to be cut is 16,896 acres.

The working-plan gives tables showing the stands of different woods, mentions the species to be lumbered, recommends that a lumber-mill be established on Raquette Lake with a branch railroad, and the building of a dam at the mouth of Raquette Lake to control the flow of water. The stumpage value of the species to be removed is given, together with rules for lumbering.

The whole subject has been gone over carefully, and shows conscientious work.

F. R. MEIER,

Consulting Forester,

MAHWAH, N. J.

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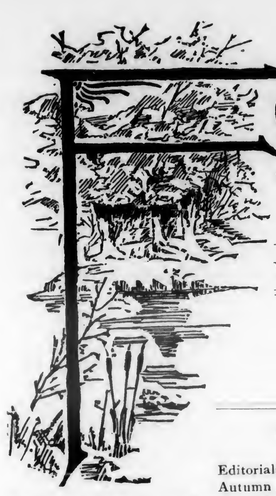

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EDITORIALS.

HAVING a special mission, FOREST LEAVES refrains from discussing problems not directly affecting forestry interests; but the third assassination of a chief executive of the nation within an ordinary lifetime, coupled with an expression of love for trees by the President, is taken as sufficient excuse for departure from our established custom.

Every true American heard with horror and shame that an attempt had been made upon the life of President McKinley, and grieved that this attempt resulted in his death. Every friend of forestry read with emotion the President's protest the last day of his life, when the curtains were adjusted to reduce the daylight glare in the sick-room: "I want to see the trees; they are so beautiful."

We have no space to waste on the cowardly assassin, or even to give the name of one who, while extending a hand to meet a friendly grasp, used the other to discharge his murderous weapon; but we have space to urge our readers to consider to what extent American toleration is responsible for conditions which make political assassinations possible in this country.

Acting upon the idea that America was to be the asylum of the oppressed of all nations, the country has become the almshouse for the world by receiving undesirable immigrants, some of whom undoubtedly "left their country for their country's good." This immigration came too rapidly to be thoroughly Americanized, and mistaken tolerance permitted lax observance of some of our truly American institutions and customs, and an apeing of those of continental Europe, with the result of a decidedly lower moral tone throughout the community. By the number of revolvers and other dangerous weapons carried, a stranger would imagine that life was in constant jeopardy. Rigid enforcement of laws prohibiting carrying

concealed weapons would make the pistol less of a universal menace.

In the heat of political campaigns partisanship pictures candidates of the opposition in such revolting shape that it is difficult for some people to eradicate the opinions thus formed; and even after the election has decided who is to fill offices, party loyalty is the excuse for continued defamation of those in authority. The American people have accepted, and too often enjoyed, cartoons which represent the President of the Republic in positions which are insulting, and which certainly weaken respect for the office.

The liberty of the press is not necessarily license to vilify. We believe firmly in the liberty of the press, and recognize the value of the medium for discussing or criticizing the acts of those chosen to represent the people; but this can be done without degrading the office in the opinion of the people. We believe that much injury results from sensationalism masquerading as journalism bringing into prominence blatant agitators by printing reproductions of their photographs and their wild talks, in connection with display headings. In this way some men and women of very ordinary acquirements, but with sufficient ability to keep them out of jail, have been paraded until their names are known throughout the land because of the abuse they have heaped upon governments, and which is forced upon the public by sensation mongers.

We sincerely hope that the deaths of Lincoln, Garfield and McKinley may arouse public attention to the necessity of careful scrutiny of the antecedents of all immigrants, the importance of having the foreigner follow American customs, rather than have these changed to suit the new comer's notion, and that the condemnation of the anarchist will include the abettor, but for whom the blatants would be unknown; for if practically unknown, except to the police and government secret service, their influence would be nullified.

We would that it were possible to keep before all our people, and especially all who make and execute our laws, President McKinley's farewell to the outside world: "I want to see the trees; they are so beautiful." Eulogies have been pronounced over the dead statesman, a whole nation stood in silence as the body of the President left its former home for the cemetery. Monuments will be erected to his memory, and two beautiful hymns have been brought close to the American heart because McKinley loved them. He loved the trees also, and while the sparks of life flickered he gave expression to this love. To the people of the United States this should be an inspiration. If they love the hymns he loved, loyalty to his memory would suggest preserving our forests. What better, more enduring monument could be raised to William McKinley than would result from a general interest in forest preservation and arboriculture, for then every village or hamlet could have a McKinley memorial grove, each schoolhouse a memorial tree, and every inhabitant could "see the trees," for "they are so beautiful."

J. B.

* * * * *

Trees in cities have a harder fight for life now than formerly, when the bricked sidewalk, flagstone gutter, and cobble or Belgian block roadway, gave some chance for moisture to reach their roots. But the newer asphalt covering seldom permits of more than a few inches of permeable soil to surround the trunk of a tree, and this soil is generally packed down so as to shed rather than collect water. Horses nibbling or men abrading the bark, tree butchers, telegraph, telephone or trolley line men lopping off branches without discretion, and often in direct violation of common sense, would seem ample cause to raise up defenders of the trees. Periodically plagues of caterpillars, locusts, or other destroyers of foliage, add to the burdens of the life of city trees, but these seldom receive attention until their number makes them a nuisance to pedestrians and housekeepers.

A treeless city is most unattractive; and when the visitor to the arid belt notices the efforts made to convey water to cities and distribute it along the streets in ditches, the value attached to sidewalk shelter is appreciated.

Philadelphia and the eastern portion of Pennsylvania have been plagued by multitudes of caterpillars, which have cleared many of the trees of their foliage this season; and this annoyance will be followed by millions of moths, each vastly increasing the number of grubs.

Proper precaution would have prevented much of the destruction, but the old saw as to what is everyone's business is no one's duty applies. Householders have sat upon their doorsteps, venting anathemas upon the city officials, while they amused themselves counting the caterpillars ascending the trees, instead of each doing what was possible to avert the nuisance. Those who draw salaries as officers, whose duties are supposed to include care of park and street trees, have failed to take prompt measures to avert or lessen the evil. There may be limitations in the power or authority of some of these which prevented as full protection as desired. But if a public officer stretches, if necessary, his authority to its full limit in the interest of the people, he will either accomplish the result attempted or secure changes in the laws which limit his usefulness. City trees surely cry out for protection, and need as many friends as can be secured.

J. B.

* * * * *

Forestry Commissioner Rothrock contributes an interesting outline of instruction which has for its object the provision of skilled foresters to care for the State reserves. We commend this to the attention of our readers, in the expectation that it will encourage suggestions and criticism. As Pennsylvania requires forested areas, provision for their care and maintenance must be made.

* * * * *

We give space to a résumé of the meeting of the American Forestry Association at Denver, Col., which was full of interest. As we perused the proceedings, which were given wide-publicity through the press, the thoughts which came were that by such conferences an impetus is given to any movement, and that the best way to advance the interest in forestry is to give the public the benefit of meetings held to discuss forest problems.

* * * * *

Gov. Wm. A. Stone has appointed Miss Myra L. Dock a member of the State Forestry Reservation Commission in the place of Mr. Albert Lewis, who, we regret to announce, resigned from the Commission.

Miss Dock's interest and activity in forwarding the cause of forestry are well known, and we are pleased to chronicle this public recognition of her work.

During the summer Miss Dock has been increasing the interest in forestry by lecturing at the Eaglesmere, Pa., Chautauqua, and also at Lake Chautauqua, N. Y.

* * * * *

We are glad to announce that Mr. F. R. Meier has promised to prepare a series of articles upon "Forestry Working-Plans" for FOREST LEAVES, which we hope to print in due course.

* * * * *

On August 22d a most successful forestry meeting was held at the Waumbek, Jefferson, N. H., addresses being made by Dr. John Gifford and Mr. J. D. Quackenbos. One of the prominent members of our Association was instrumental in securing a good audience. Dr. Gifford thinks that New England is ripe for forestry, and much has been accomplished. He also spoke at Maplewood, and during the coming winter expects to lecture in some of our cities.

* * * * *

We are pleased to inform our readers that the Pennsylvania State forest reserves have been rapidly increased this year, the total now owned being 324,000 acres. We trust this nucleus will continue to grow until we have large, well-established and profitable reserves in various portions of the State.

Autumn Arbor Day.

PENNSYLVANIA now owns a forest reserve of 324,000 acres. This is one result of the movement which began with the observance of Arbor Day in the schools. People everywhere begin to see the importance of planting trees and caring for them, and of legislation designed to secure a rational treatment of trees and forests. Moreover, the decisions of the Courts have helped to stop the ruthless mutilation and destruction of trees along telegraph and trolley lines. And the sentiments awakened in the hearts of the young through the observance of Arbor Day have reinforced and strengthened the teachings of experts in regard to the deterioration of agricultural lands through the denudation of our forest areas.

Forestry is one of the coming professions. The senior classes of our Schools of Forestry have lucrative places waiting for them in advance of the day of their graduation.

In connection with the observance of Arbor Day, it will be proper to draw attention to the prospects of educated young men who devote their lives to this new profession.

Since trees can be planted in the fall as well as in the spring of the year, and since thousands of rural schools are closed at the time fixed for the observance of Spring Arbor Day, it has become customary to appoint an Arbor Day in the autumn months. In accordance with this custom,

FRIDAY, OCTOBER 25, 1901,

is hereby designated as Autumn Arbor Day; and the teachers and pupils of our public schools are requested to observe the day by the planting of trees and by other suitable exercises.

NATHAN C. SCHAEFFER,
State Superintendent of Public Instruction.

HARRISBURG, October 1, 1901.

Dr. B. E. Fernow, in a recent letter, states that he expects more than fifty students to enter the New York State College of Forestry in the fall.

In the note in the August issue on the large pin oak at Llanerch, the height at which the circumference was taken above the ground should have been given as 14 inches instead of 14 feet.

A Suggested Pennsylvania Forestry School.

THE State of Pennsylvania is already in possession of a large body of land. This promises to be a fine business investment for the Commonwealth if it is managed upon business methods, and in accordance with the principles which the experience of other nations has proven to yield the largest results. Next to the public school system of the State, if there is any department of the Government which cannot afford unskilled or untrained labor or direction, it is the Forestry Department. It is absolutely necessary, whenever a suitable man has been discovered among those employed in caring for the forests of the State, that he should be assured that his tenure of office will be for life or during good behavior. This statement applies, however, mainly to those who are employed to do the lowest form of forestry work. It seems to the writer that, in addition to this, the State of Pennsylvania, which now justly claims to have been the first State in the Union to recognize the vast importance of its forestry interests, and to have provided a separate department in the State Government for them, may also be the first to place its State land under a proper, progressive supervision, and to do this at the minimum of expense, and with the certainty that all money actually expended in advance of returns will be guaranteed again to the State. The plan which the writer has now in mind is, that the Legislature of the State at its next session, availing itself of any one of the several desirable locations which the State already possesses, and of the buildings to be found there, establishes a school for practical instruction in forestry. That, in addition to the services of the forester now in the service of the State, there be employed one additional teacher to give instruction in mathematics, surveying and road making, and that an additional instructor be provided who shall be familiar with the trees and the animal life of Pennsylvania; that as soon as such provision is made for instruction, a body of twenty young men may be selected by competitive examination to form the first class.

Second, that those who have successfully passed the examination shall then undergo a physical examination to prove that they have the strength and ability to become successful foresters. When these tests, mental and physical, have been successfully passed, the applicant shall then be recognized as a forestry apprentice; that he shall receive his board and lodging at the expense of the State, and in addition thereto a modest sum each month which will be sufficient to provide his clothing.

Provided, however, that he shall first have given acceptable bonds to reimburse the Commonwealth for all the expense it may have incurred in his care and education if at any time within the first two years he shall have failed in an examination, or be from any cause discharged from the school. During the first two years of service the forestry apprentice shall, under the direction of his instructors, pass at least one-half his time, except Saturdays and Sundays, in actual work in the adjacent forests belonging to the State. The remainder of the time, except such time as may be lawfully designated as a vacation, shall be employed in such necessary studies as may be designated by the Forestry Department of the State of Pennsylvania. At the expiration of two years, after having passed examinations at the end of the first and second years, and given acceptable bonds, the forestry apprentice shall then be advanced to the grade of forestry cadet, and be obliged to wear a uniform by which such officers in the employ of the State shall be recognized, and by virtue of which, and legislative authority to act as peace officers on the State land, they shall be authorized to arrest those who are found violating the forest laws of the Commonwealth, and also be authorized to take charge of working parties in the field. After an examination at the expiration of the third and fourth years, which shall have been successfully passed, the forestry cadet may then receive a further promotion to the rank of assistant forester. Then, upon renewal of his bond, the assistant forester shall be entitled to a suitable change in his uniform and a suitable additional compensation, and shall continue his studies and labors at the school under the direction of the Department of Forestry for two years more, at the expiration of which time, if he passes a satisfactory examination at the end of the fifth and sixth years, he shall be entitled to receive a diploma and a degree of Forester. For each year succeeding the first year of the school the State Department of Forestry may designate the number of students, not exceeding twenty, who shall be admitted to the privileges of the school, provided they pass by examination as the first class did.

It is understood here that there shall be no period of tuition when the student of this school shall not be liable to do manual work in the State forests for at least half of his time, and that failure to do his part may at any time render him liable to immediate expulsion.

Second, that there shall be no period of the six years specified in which he can remain at the school without having given suitable bonds to reimburse the State for all the money expended up to that time for his education.

And, third, that each promotion shall bring with it a slight advance in the monthly allowance of the pupil, because each year his services will become more valuable to the Commonwealth.

Fourth, that as the higher grades of study are reached suitable instruction shall be provided, with the understanding that instruction so given shall be either directly practical in character or of such a nature as will enable the student to make a better practical application of the knowledge of forestry which he may acquire.

This is but an outline of the plan which has been gradually shaping itself in my mind. Its manifest advantages are, that from the hour this work is commenced the State will be receiving the benefit of skilled labor upon its forest lands.

Second, that it will guarantee to the State in the promptest and most certain manner, and without any pecuniary risk to the Commonwealth, a body of trained foresters who will be intimately acquainted not only with forestry principles, but with the ground upon which those principles are to be applied.

And, third, that it will create a self-respecting, cultivated body of men, with the *esprit de corps* which will enable the American forester to take rank with the forester of any other country. This never can be done, nor can we hope for the best results in our forestry operations, until we fully realize that a competent forester must be much more than a wood-chopper or a wood-ranger.

J. T. ROTHROCK.

The Pike County Pennsylvania Reservation.

THE Pike County Reservation consists of about 30,000 acres of land in an almost solid body. It is situated near the centre of the county, and takes in the headwaters of many small streams emptying into the Delaware River. It encloses several lakes, and is close to numerous others, some of which are of considerable size. These streams and lakes afford, perhaps, the best pike, perch, bass, pickerel and trout fishing that can be found within the State.

The character of the land is usually quite different from that of the reservation in Clinton County, being mostly rolling ridges, with shallow basins that hold either a swamp or lake, instead of high, flat ridges and narrow valleys. Only here and there is a prominent point, but the views that are obtained from these are magnificent.

Except in a few locations the soil is nowhere fit for agriculture, and for this reason is best adapted to forestry purposes. There are many signs to prove that at one time the whole country not then covered with lakes was very heavily wooded, for in the swamps there are still found, occasionally, white pines and hemlocks from three to four feet in diameter, having tall, straight boles, and on the ridges are found the remains of many pitch pine stumps that were more than twenty-four inches across.

At present, notwithstanding the heavy and reckless lumbering that has been carried on, and frequent fires, the wood that remains and the conditions that exist for its preservation and increase are very good. In the swamps, where fires seldom go, there is found white pine, hemlock, spruce, birch, maple and ash to a considerable extent, with now and then a tamarack or a yellow poplar. The rocky "swales" at the heads of swamps are usually covered with a growth of shell-bark hickory and basswood. White walnut or butternut is frequently found with them. The slopes of the ridges where fires have not killed everything are covered with chestnut, white oak and rock oak sprouts, and on the ridges pitch pine is found in varying quantities—in some places a few old trees, and in others a fairly good stand of timber. Where fires have been most frequent there is nothing left but sweet fern and scrub oak.

Everywhere nature is seen trying to better these conditions, and all that is necessary to aid it is to keep out the fires. Where this has been done the young timber is coming up in dense groups, and is making a vigorous growth. White oak slowly pushes its way up through the scrub oaks, and then in a short time crowds them out entirely. Chestnut sprouts do the same. White pine is coming up nicely in woods that have been protected, and, as is usual for pitch pine in other localities, if given a chance, it soon covers the ground with a very dense stand of young trees. Spruce regenerates well in the swamps, but would be much better, of course, if helped to some extent.

Fortunately the people of Pike County are beginning to see the value of good roads, and at the same time they recognize their value as fire lines. Very frequently the question as to how the State intends to protect its lands from fire is followed by the suggestion that the only way will be to establish gradually a complete sysem of roads and trails both around and within the reservation. If the natives see the practicability of such a course, why should it not be encouraged by the people of the State in general? It is very encouraging, too, to know that with a few exceptions the people are very much in sympathy with the forestry movement, and seem to be willing to do their part in the protection of the reservation. GEORGE H. WIRT.

Forest Incendiarism Punished.

CENTRE County is to be congratulated upon an initiative towards punishing those who set fire to woodlands, as will be evident from a perusal of the record below.

That Judge Love appreciates the value of forests is apparent from the character of his charge and sentence; but the recommendation of clemency coming from the jury suggests that public opinion is not thoroughly awake to the enormity of the crime. We rejoice that in this case the penalty of the law has been visited upon the guilty parties.

COMMONWEALTH *vs.* JACOB MCCLOSKEY and WILLIAM CHATMAN.	}	In the Quarter Sessions of Centre County.

The above defendants were indicted for firing the forests in Curtin Township, Centre County, April 27 or May 4, 1901. There had been a fire in that region April 1, 1901, that burned over considerable territory—several thousand acres. The information got out that these two young men had been seen setting fire in the woods about the time the large fire occurred. Mr. Rightnour, our county detective, investigated the matter, and was satisfied the rumors were correct. He took out a warrant and arrested the young men in Potter County. They were brought here, and were indicted and tried at August Sessions. The evidence, although there was some discrepancy as to date of large fire, whether April 27th or May 4th, satisfied the Court and jury of their guilt. The jury convicted them, and the Court sentenced them. Imposing sentence, the Court said that the frequency of forest fires, either put out criminally or by gross carelessness, is a very serious question, and that all good citizens should become interested to prevent them. That to grow forests requires centuries, and to wilfully or negligently destroy them was criminal, and wrought serious injury not only to the property of the owner of the timber burned, but was denuding our mountains of timber and foliage, causing severe droughts and serious floods, and also limiting our natural water supply by causing our mountain streams, no longer protected by the growth of forests, to dry up. All good citizens, therefore, should become interested in the importance of this question, and put forth an honest effort to stay the hand of the timber-destroying vandals and criminals. The defendants were recommended by the jury to the clemency of the Court, which the Court took into consideration, and sentenced them each to six months' imprisonment in the county jail, and Jacob McCloskey a fine of $50, and William Chatman a fine of $25.

The Appalachian National Park.

ATTENTION has been called a number of times in FOREST LEAVES to the proposed Appalachian National Park in western North Carolina, western Tennessee, and adjacent States.

The reasons advanced by the advocates of this park for its favorable consideration by Congress are as follows:

First, the East and South have no National Forest Reserve.

Second, the West and North have many.

Third, Western North Carolina presents every requisite for a perfect timber preserve and National Park as regards climate, scenery and timber.

Fourth, lumbermen are rapidly devastating the whole section.

Fifth, the greatest region in the United States for a variety of hardwood timber is here found.

Sixth, the region under contemplation forms the headwaters of all the streams of the Southeastern States.

Seventh, it is necessary to preserve this timber in the mountains in order to retain the water supply of these States.

Eighth, lumbering and barking will in the next few years make the establishment of a National Forest preserve in this part of the country impossible.

Ninth, the region is within easy access of all the Eastern and Southern States.

Tenth, such a forest reserve would soon become stocked with game and fish; and,

Finally, it is the duty of the people of this generation to preserve such a section of the Southern Appalachian mountains, to hand down to posterity a part of the country in its primeval condition.

Secretary Wilson, of the Department of Agriculture, made a report on the proposed park to the President early in the year 1901. He stated in this report that the matter was worthy of careful consideration, but said that the movement for the purchase and control of a large area of forest land in the east by the Government has chiefly contemplated a national park. The idea of a national park is conservation, not use—that of a forest reserve, conservation by use; he therefore recommended a forest reserve instead of a park. It is fully shown by the investigation that such a reserve would be self-supporting from the sale of timber under wisely directed conservative forestry.

In describing this section, Secretary Wilson says:

"Extensive areas of hardwood forests are still in their primitive condition, and these are among the very best and richest hardwood forests of the United States. The region in general is better adapted for forestry than for agricultural purposes. It is located about the headwaters of numerous streams, such as the Ohio, Tennessee, Savannah, Yadkin and Roanoke, which are important both for water power and for navigation. The general conditions within the region are exceptionally favorable for the carrying on of large operations in practical forestry, and the weather is suitable for lumbering operations at all seasons of the year. It contains a greater variety of hardwood trees than any other region of the United States, since the northern and southern species here meet. It is a region of exceptional beauty and picturesqueness; and although it would not be easily accessible to visitors in all parts in all seasons of the year, by far the greater portion of its area would be easily reached, and climatically pleasant throughout the year.

"It contains within the forest-covered areas no large settlements or large mining operations which would interfere with the management of such a forest reserve, and yet there is a sufficient population for the working and protection of the forests. Lands in this region suitable for such a forest reserve are now generally held in large bodies of from 50,000 to 100,000 acres, and they can be purchased at prices ranging from $2 to $5 per acre. It is probable that the average price would not exceed $3 per acre. In explanation of the widespread and urgent demand for the establishment in this southern Appalachian region of a national park or forest reserve, it may be added that it contains the highest and largest mountain masses, and perhaps the wildest and most picturesque scenery east of the Mississippi River; that it is a region of perfect healthfulness, already largely used as a health resort both summer and winter.

"The rapid consumption of our timber supplies, the extensive destruction of our forests by fires, and the resulting increase in the irregularity of the flow of water in important streams have served to develop among the people of this country an interest in forest problems, which is one of the marked features of the close of the century. In response to this growing interest, the Government has set aside in the western forest reserves an area of more than 70,000 square miles. There is not a single government forest reserve in the East."

Our late President, Wm. McKinley, recommended the favorable consideration of the report by Congress.

A summary of the National and State legislation in regard to this park since the organization of the Appalachian National Park Association, November 22, 1899, is as follows:

January 2, 1900. Memorial of the Appalachian National Park Association presented to Congress, and referred to the Committee of Agriculture.

April 17, 1900. Officers of the Appalachian National Park Association appeared before the Committee of Agriculture, presenting the cause of the Appalachian Park Association.

April 21, 1900. Senator Pritchard introduced a bill praying for an appropriation of five thousand dollars for a preliminary investigation.

April 26, 1900. Senator Pritchard's bill asking for an appropriation for investigation passed; became a law July 1st.

Summer of 1900. Government Forestry Bureau, with the co-operation of the Geological Survey, investigated the Southern Appalachian Mountains.

January 1, 1901. Secretary Wilson, of the Committee of Agriculture, sends report to Congress, through the President, regarding the preliminary investigation made.

January 19, 1901. President McKinley presents Secretary Wilson's report, with a special message to Congress recommending this report to the favorable consideration of Congress.

January 20, 1901. Senator Pritchard introduced a bill praying for an appropriation of five million dollars for the establishment of a forest reserve in in the Southern Appalachian Mountains, approximating two million acres. Bill referred to Committee on Agriculture.

January 28, 1901. Senator Pritchard's bill asking an appropriation of five million dollars was reported back favorably by the Committee of Agriculture.

January 18, 1901. North Carolina passed a bill ceding to the National Government the authority to acquire title for forest reserve purposes, with exemption from taxes.

January 29, 1901. South Carolina, ditto. Georgia, ditto.

March 22, 1901. Alabama, ditto.

March 28, 1901. Tennessee, ditto. Governor signed bill April 25th.

July 3–10, 1901. Secretary Wilson, accompanied by J. A. Wilson, his private secretary, Prof. Gifford Pinchot, Chief of the Government Forestry Bureau, W. J. McGee, U. S. Bureau of Ethnology, F. H. Newell, U. S. Geological Survey, J. A. Holmes, State Geologist, and Hon. Theo. F. Klutz, member of Congress of Seventh District, spent ten days in the Southern Appalachian Mountains making a personal investigation of the sites where it is proposed to locate the Appalachian Forest Reserve.

The Third Annual Meeting of the Appalachian National Park Association was held at Asheville, N. C., on September 10th, and the old officers were re-elected. Mr. Geo. S. Powell, President; Dr. Chase P. Ambler, Secretary and Treasurer.

A Peculiar Tree Growth.

THE manner in which trees overcome many conditions unfavorable to their natural growth and apparently weakening in effect is remarkable. Under the care of horticulturists and landscape gardeners they have been forced to assume odd and artistic shapes, and not infrequently peculiar forms of tree growth are found in the forests.

The stem of the tree, which is shown in the illustration, was found within a dense rhododendron swamp in Pike county. The young white pine must have had a very hard time to force its way through the mass of rhododendrons and finally lift its head above them, but even then it was only to meet with disaster. When the tree was about twelve feet high the winter snow or ice broke off the top shoot and made it necessary for a branch in the top whorl to become the leading shoot. This had been bent downward, either in the same year or in the year following the one in which the top shoot was broken off, but finally it succeeded in straightening out and was making a rapid growth when found. It is not at all probable that this tree was interfered with by man.

A few days later in the summer a large white pine tree was seen with a similar crook in its top. The tree measured about twenty-four inches in diameter at breast height and had a clean stem for at least sixty feet. There it turned at a right angle and formed a large circle. The crook, where it started, was eighteen to twenty inches in diameter. Above it there was nearly twenty feet of straight growth.

GEORGE H. WIRT.

A Surveying Experience.

IN the early days of the State, when land was being taken up and patented, not all of the tracts were actually surveyed and distinctly marked by lines and corners. Many were simply plotted in the office of the surveyor, and some had, perhaps, only two or three lines actually surveyed. Drafts showing the location of each tract of land had to be returned to the land office at Harrisburg, and that mistakes were made either in the survey or in the plot is not at all unlikely.

Nor was all the land taken up at the same time, half a century elapsing between the time one tract was patented and that of an adjoining one. When the vacant land was surveyed, the result was that in many cases "laps" or "gores" occurred, but upon the drafts these could not be seen.

To resurvey land in a location where mistakes, laps and gores seem to have been numerous, where fires have destroyed the timber, making it impossible to follow the "side lines" put upon old trees by former surveyors, where bears, and perhaps men, removed old corners, and where new ones were put up to take in or leave out a particular strip of timber or other valuable property, is not a pleasant task, as all the reasons above enumerated add greatly to the troubles of a surveyor.

During the recent survey of State land in Pike County such a place was found, but after several days of hard work in unraveling the defects in the official notes, an interesting discovery was made, which proved to be of practical importance. The surveyor was shown an old land corner, from which he proceeded to run a course according to his official draft. At the given distance a corner could not be found; but as the draft called for stones by a chestnut stump, the line was continued for some distance, and another search was made. Still no corner was found. It was then decided to return to the starting-point and run a line around the tract in the opposite direction. At the given distance on this line a stone corner was found, as called for. The end line was then run, but here no corner could be found. This tract was then abandoned until a line connecting the points where corners were not found could be brought in, which was done by starting some distance from the first tract. When the latter line was run, it proved to be forty rods from where the tract in question should be, according to the official notes.

About this time a later draft was found, showing two stone corners, sixteen rods apart, located upon the line still unrun. These were found, and the line continued both ways until it cut the lines that were run a few days previously. These intersections lessened the width of the tract by about twenty rods, but at some distance from one was found what was intended for a corner, as there was a "witnessed" tree near by; that is, it had three notches cut in it facing the supposed corner.

Another trial was made by starting at an old but doubtful corner, and at the given distance this last line met the first line, where the corner should have been found. At this point was at one time a chestnut stump, but out of it had grown a sprout that was now twelve inches in diameter, and which was recently cut, and about ten feet away was a large white oak twenty-two inches in diameter. It was certain that if a corner was ever there the white oak would have been witnessed. On close examination, signs of a very old axe mark were found on the bark. A block was cut out, and an old blaze was found; it was perhaps fifty

TRUNK OF WHITE OAK SHOWING "WITNESS MARKS" MADE IN 1793 AND 1901.

INSIDE VIEW OF WOOD GROWTH MADE SINCE AND COVERING "WITNESS MARKS" OF 1793.

A WHITE PINE FREAK.

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INSIDE VIEW OF WOOD GROWTH MADE SINCE AND COVERING "WITNESS MARKS" OF 1793.

A WHITE PINE FREAK.

INTENTIONAL SECOND EXPOSURE

years old. No other marks were seen, but it was decided to chop off the side of the tree in order to settle all doubt. After cutting through four inches of solid wood the old witnesses were found, and they were still as clear as when made. The tree had been barked before the notches were cut, and as the new wood grew over the scars it filled them up, as may be seen in the illustration. With the aid of a microscope the rings of wood were counted to nearly one hundred. The original survey was made in 1793, and it is safe to suppose that the notches were made in the summer of that year.

It is not necessary to state that a large stone corner was built at once and the tract closed in, the State, by priority of patent, being about forty acres of land richer.

GEORGE H. WIRT.

The Summer Meeting of the American Forestry Association.

THE special summer meeting of the American Forestry Association was held in Denver, Colo., August 27–29, in affiliation with the American Association for the Advancement of Science.

The address of welcome was made by U. S. Senator Thomas M. Patterson.

A number of papers were read, and several interesting discussions were enjoyed.

Dr. A. D. Hopkins contributed papers on the "Forest Conditions in West Virginia" and "Insect Enemies of Forests and Forest Products." Prof. R. H. Forbes presented a monograph on "The Open Range and the Irrigation Farmer." Dr. Wm. L. Hall, on "Progress in Tree Planting." Mr. Edward W. Griffith, on "The Black Hills Forest Reserve." Prof. L. H. Pammel, on "What Should be the Policy of the United States in the Uintah Forest Reserve?" Mr. F. H. Newell, on "Forests and Reservoirs." Mr. R. L. Fulton, on "The Reclamation of the Arid Region." Mr. S. J. Holsinger, on "The Boundary Line Between the Forest and the Desert." Mr. T. P. Lukens, on "The Reforestation of Watersheds." Prof. W. R. Dudley, on "The Santa Lucia Silver Fir." Mr. Gifford Pinchot, on "Grazing in the Forest Reserves." A. L. Fellows, on "The Hydrography of Colorado." Wm. H. Knight, on "The Underflow of Water in Southern California." George H. Maxwell, on "The Relation of Forests to Irrigation." Prof. Charles E. Bassey, on "Twenty Native Trees of Nebraska." Prof. W. J. Beal, on "The Future of White Pine in Michigan," and George B. Sudworth, on "Forests, and Their Relation to Agriculture and Manufacturing Industries." There were also illustrated addresses by Mr. Gifford Pinchot, on "The Government and the Forest Reserves," and F. H. Newell, on "Forests and Irrigation."

The following officers were elected: President, Hon. James Wilson, Secretary of Agriculture; First Vice-President, Dr. B. E. Fernow; Corresponding Secretary, F. H. Newell; Recording Secretary, Geo. P. Whittlesey; Treasurer, Otto J. J. Luebkert; Directors, James Wilson, Edward A. Bowers, Frederick V. Coville, B. E. Fernow, Henry Gannett; Arnold Hague, Thomas F. Walsh, F. H. Newell, Gifford Pinchot, George P. Whittlesey, Henry S. Graves.

The Greek Church and the Forests.

THE eastern part of Greece, especially Attica and Argolis, is sinking almost hopelessly into an arid condition. The lack of forests to hold the moisture causes the heavy rainfall of the winter months to sweep down the gullies and river beds, and, overflowing these, to carry off a good deal of soil every year. Then, during the four months, June to September, as a rule, no rain falls over the greater part of the kingdom. Forests therefore find it hard to hold their own. Nothing more impresses one who has been several years continuously in Greece and then travels through Austria, for example, than the luxuriant foliage and green fields in midsummer. Within the last few years some attempt has been made at tree-planting, but this, as is so often the case in Greece, is likely to be spasmodic and to avail little against the drift already mentioned, which is powerfully assisted by goats and forest fires. Greece pays dearly for her goats. They are everywhere, and wherever they are young trees cannot grow. The holm oak, for example, if left to itself, attains a height of thirty or forty feet; but it is usually kept down by the goats to the dimensions of a shrub, at the top of which they can continually gnaw.

An even greater enemy is the forest fire, because it is constantly attacking groves of larger trees—pines, for example—which have escaped the goats. A few years ago nearly the whole side of Pentelicus, which confronts Athens, was on fire for two nights, making a grand spectacle for Athens. I once counted twenty-four forest fires on a journey by sea from Piræus to Nauplia. The burning, at the beginning of the nineteenth century, of half of the magnificent pine forest which covered Mt.

Ænus in the island of Cephalonia, was counted as a great calamity throughout the Mediterranean basin, where these pines were well known under the name of *Abies Cephalonica*. About five years ago half of what was left of this forest was burned, the most serious disaster occurring to the pine forests in recent years—yet, after all, only one of a series. Hardly a summer passes in which one or more areas of several square miles are not denuded of their pines by fire.

This evil is difficult to cope with, because, in the long, dry summer, the vegetation on the surface of the soil is reduced to tinder, and when the gentle shepherd, who always smokes, throws down his match, he is likely to start a fire. He is suspected of doing it sometimes of set purpose in order to increase the area of pasturage. Of the attempts to prevent fires in the last few years that of setting guards has not proved effective. The area can hardly be covered by the available force of guards, and then, besides, *quis custodiet ipsos custodes?* Two years ago it was seriously proposed to introduce the punishment of expatriation for those who even inadvertently set fire to a forest. This expatriation meant merely transportation to another part of Greece, but even this would, to a Greek, have considerable significance, inasmuch as to him the little town or village in which he is born is his fatherland, his *πατρίδα*, as he calls it. The proposed measure was never adopted, and the evil ran on. Now one of the strangest measures, perhaps, ever adopted to meet such an emergency has been taken, and the result of it may be watched with great interest.

On July 2d there appeared among the official bulletins issued by the Government an encyclical proclamation of the Holy Synod "to all priests, monks, and other Christians, to the end that they refrain rigidly for the future from burning a forest, and from every other damage to public and private forests and trees, and from concealing or protecting those guilty of such a crime." The encyclical gives effect to the proclamation by the following curse:

"If, then, contrary to hope and expectation, and in spite of this proclamation, there should be Christians who persevere in this unholy practice, abhorred of God, either setting fire to forests themselves or encouraging others in the act, or not bringing information immediately before the proper authorities against the persons whom they know to have set the fires, and not coming forward as witnesses to secure confirmation of their guilt and punishment of the guilty, and not affording zealous co-operation with the public officials in the matter when they are able to do so; let all such persons, whoever they may be, be excommunicated from the Church, accursed, and shut out from forgiveness. The wrath of God and the curse of the Church be upon their heads, and may they never see the success of whatever labors they may be engaged in, and may they have the curses also of all the saints and the inspired fathers of the Church."

In a concluding paragraph "the Holy Synod enjoins upon the reverend hierarchs and the bishops to announce in all the churches of the realm the punishments to be inflicted upon the burners of forests, whether public or private."

It is not strange, considering the magnitude of the threatening evil, that recourse should be made to almost any means to prevent it, but this is probably the first case on record in which the enginery of the hierarchy, curses and all, has been brought to bear upon the destroyers of forests. The matter may have more than an ephemeral and local interest.—RUFUS B. RICHARDSON, in the *New York Evening Post*.

Correspondence.

RADNOR, PA., August 12, 1901.

Editor FOREST LEAVES:

I entirely agree that forest land containing lumberman's waste makes a hot forest fire that is destructive to standing timber; but with this admission I still maintain that the subject of lumbermen's waste as it relates to forest fires is one of small importance, and worthy of no serious consideration. In further support of my arguments upon this subject I would say that, should it be found advisable to have such waste disposed of, one of the two following methods must be employed: it must either be removed from the place of cutting or destroyed by fire without removal.

An average acre of good timber contains about thirty trees of saw-log size. These trees are cut down and logged off to the first big limbs. The *débris* of the trees, which comprises a very large percentage of the weight and a still greater part of the bulk, is left upon the ground as waste. To remove this offal would be a monstrous task, both expensive and laborious—so much so that no lumberman would attempt it unless compelled to do so by law; and such a law is out of the question.

If this is the case, fire is the logical solution of the problem. The waste must be burned upon the land whereon it is produced. First, we must consider that to burn either green or wet tops is an exceedingly difficult task, and one correspondingly expensive; therefore a dry burn is the practical way, and the one to be considered. The tops of well-grown trees are large and very heavy, so that the idea of collecting them together for burning purposes is almost out of the question, especially on rough mountain or swampy land, where most of our good timber is now to be found. The method of burning this waste would be about as follows: The tops would lie upon the ground where they had fallen, until thoroughly dry and in condition to burn; then, to complete the destruction, a suitable day would be selected, and a wholesale burning would begin. Now, who can imagine a gang of lumbermen protecting young timber from fire? What do they care about the destruction of a few young saplings? Of course they would not wilfully fire the woods, but think of the dangers that would attend this undertaking! A forest fire would almost invariably follow, with the usual results. The risk would be entirely too great; not worth the taking; for if you let the top waste alone for a year or two, and the tract escapes fire, the leaves and fine needles that cling to the branches will disappear, and there need be no further concern about the remainder. If I am right in asserting that the lumberman would burn his offal regardless of young timber, then it would not matter whether this waste was destroyed by the lumberman's match or by the consuming forest fire, as the damage to the surrounding timber would be the same.

There is another advantage in allowing this offal to remain upon the ground. It gives a vast amount of protection to wild game and song-birds, and this alone is worth considering.

In criticising my article in the last issue of FOREST LEAVES, it was claimed that lumbermen's refuse made the whipping process of putting out a forest fire a very difficult task, and I agree that such is the case; but when it is considered that it is only under the most favorable conditions that this method can be successfully employed, it, after all, is a trifling matter; for it must be remembered that when there is a considerable quantity of underbrush, or where the fire is being driven by a stiff breeze, the whipping process is simply out of the question; in fact, about the only instance where it is practicable is where the woods are open, little to burn, and a short fire line. Backfiring from wagon-roads is the successful method for controlling a mountain fire, and a few experienced men can accomplish a great deal; but, unfortunately, it too often happens that no one will interest themselves enough to render any assistance, and the fire sweeps on until either arrested by rain or exhausted for lack of material.

J. G. DILLIN.

Effects of Deforestation in China.

MR. F. LYNWOOD GARRISON, a member of our Association, presented an interesting paper, bearing the above caption, before the Franklin Institute, from which the following excerpts have been taken:

The protestations from well-informed organizations and individuals against the destruction of forests in the United States have been so persistent and well sustained that general public interest has now been aroused to some sense of responsibility.

While it is obvious to every one that our timber resources are rapidly melting away, very few realize the dangers of this deforestation, or its effects upon the productive capacity of the country as our population becomes rapidly denser.

Droughts we have had, but famines never. Will famine be the concomitant of drought when our population numbers 400,000,000? is the natural and irresistible reflection in this connection.

If any doubts that drought, flood and famine follow deforestation as surely as night succeeds day, let him visit China and carefully study the writings of the few competent observers who have lived in and travelled through that little known country.

It is safe to say that drought, flood and famine are of annual occurrence in one or another portion of the Middle Kingdom, and that the famines are apt to be severe, owing to the lack of efficient transportation from more favored sections of the Empire. It must not be assumed, however, that even a thoroughly good system of railways throughout China would prevent famine, though undoubtedly it would check absolute starvation.

Russia, which is well provided with railways, seldom has a year without famine. Grinding poverty, filth and superstition are the common lot of the Chinese peasant and the Russian muzhik, and if there is any choice the Chinaman is probably the better off of the two. Similar causes have produced similar effects in both countries; deforestation has already ruined much of China, and is beginning to spoil some sections of European Russia. There is a general tradition amongst the natives throughout the whole of the Middle Kingdom that the mountains and hillsides were once covered with forests, and that the rains have decreased in frequency and increased in violence from generation to generation. In China, as in some other countries, the floods were formerly regular during successive years, whereas at later periods they have grown more irregular and violent. In mountainous regions torrential rains do not soak into the bare uncovered earth; the rapid run-

off tears up the soil, fills the water courses and lakes with gravel and sand. Standing on the mountain tops of eastern Shantung last summer, it was not difficult for the writer to picture in his mind those bare brown hills covered with primeval forests, the dry rocky gullies filled with babbling brooks, and the deep valleys studded with beautiful lakes and streams now filled and choked with sand and gravel. The once deep-bayed indentations of this fine sea-girt province are deep no longer, but are now so silted that a good anchorage for deep-draft ships can only be obtained even in the best of the harbors, like Wei-hai-wei and Kiao-chau, by constant dredging, The celebrated geographer and geologist, Baron von Richthofen, in speaking of Shansi province, remarks "that the traveller at every step has occasion to contrast the present poverty and inertness of the inhabitants with the signs of a previously better condition. The large cities, even the villages, the temples, the remains of magnificent public structures, as well as the history of China, give evidence that the northern provinces have been in a more prosperous state." The cause, aside from political, that led to these conditions Richthofen believes is the deterioration of the climate, which is the probable consequence of the extermination of the forests. Throughout the whole country, from Hankow to Peking, the mountain and hillsides are destitute of trees and shrubs, and offer a most desolate aspect. The exceptions are the groves of trees at the villages and temples and parts of the Fu-niu-shan mountains, where many hillsides are planted with oak trees for feeding silkworms. Richthofen thinks there are no positive proofs that these conditions had formerly been otherwise, but it is exceedingly probable, and the people everywhere assert that their mountains were covered with trees in old times. He further states that besides this injurious effect of the destruction of the forests upon the climate in general, there is an immense amount of deterioration incessantly going on, which would not take place if the hills were wooded. The heavy rains wash off the soil from the rocks, and the water, instead of penetrating into the earth, and being stored up for feeding springs, runs off the hillsides and descends in torrents through gulches which were before perfectly dry. In the valleys, the rivers, in overflowing their banks, spread much fine sand or silt over the surface of the fertile alluvial soil, thus often rendering extensive regions unfit for agriculture. Instances of this kind are, according to Richthofen, numerous in Shansi, on the borders of the great plain. If it were not for the *löss* formation, he declares that northern China would already be a desert, with some fertile valleys enclosed. Even this beneficial formation, which is the principal seat of agriculture, and, more than other kinds of soil, capable of storing up moisture, is undergoing a rapid destruction.

Archibald J. Little, in writing of Szechuen Province, remarks that at the present time in China wherever there is a stream that will float a log, there are no logs to float, and he might have have added that in places where timber could not be in any way transported, it is converted into charcoal. Little says the Chinese have a regular locust-like propensity to destroy every green thing wherever they penetrate; for when the trees are gone, comes the turn of the shrubs and bushes, then the grass, and at last the roots, until, finally, the rain washes down the accumulated soil of ages, and barren rocks remain. While this statement may be rather extreme, there is reason to believe the rainfall has considerably diminished in many portions, and is much more irregular and uncertain. All observers agree that the rivers have shrunken in volume, and droughts occur where they had been quite unknown. According to Little, in northern Szechuen, in what is known as the "red basin," situated at the foot of the mountains, there have now been successive seasons of drought.

On the Yellow River below Kai-fung-fu, after it has debouched into the "Great Plain," it is necessary to protect the surrounding flat country from inundations by the river with great embankments or dykes. These extensive and costly engineering works were formerly protected from the erosion of both water and wind by a mantle of grass and bushes, and at some points willows were carefully planted, with excellent results. Neglected by the authorities, these embankments are now the prey of the peasant of that vicinity, who are so poor that they eagerly pull up every blade of grass and every root that can be found. The poverty-stricken condition of these poor people must be almost incredible; they are constantly subjected to inundations from the river by reason of the steady deterioration of the dykes; yet, it seems with a full knowledge of the consequences, they do nothing to preserve and much to accelerate the total destruction of these protective works. If something is not soon done by the authorities, much of this country will become uninhabited and uninhabitable.

The Dutch hydraulic engineer Ryke, in his comments upon the improvement and defense of the Yellow River, remarks: "Stopping the abuse of nature committed by the people would be in the interest of every plain, valley and dale in the mountains, as well as the plains in Honan and Shantung, now liable to dreadful inundations during every rainy season. By deforestation (deboisement) and all it entails, almost every mountain and hill stream has become torrential, and this means that the rainwater leaps downward in waves as soon as it falls; it means further, as a matter of course, the misery of a water famine in dry seasons." Ryke affirms that upon several occasions when it was necessary to examine a mountainous section of country for the sake of a stream, or for plains liable to inundation, he had only to look on the map of the district to know beforehand where to find the worst cases, and they were invariably where the greatest number of villages and hamlets were indicated. He means, of course, by this, that the evil results of deforestation are in a direct ratio with the number of habitations and density of population. Williamson, in his remarks on his journey through Shansi, states that on the roads leading through defiles stones are erected with inscriptions warning passengers against the sudden rush of waters in case of a rain storm. "*At this place beware of the mountain water*," and "*travellers should not take shelter from the rain here*," are notices posted in many places.

Some idea of the rapidity of the run-off in the mountainous sections of China can be obtained by gaugings at Chung-king, in Szechuen. According to Little, on July 6th, of one year, the Yangste River stood 38 feet 6 inches above the mean winter level; in consequence of heavy rains in Yunnan it rose by the 13th of this month to 96 feet 8 inches, and fell again by August 3d to 28 feet above the winter level. It rose again on August 16th to 57 feet, this rise being due to the rains in the basins of the Ta and Tung Rivers in western Szechuen. After this date the river suffered comparatively slight fluctuations, steadily subsiding towards the lowest February level.

If additional evidence is needed of the effects of deforestation in China, the indisputable fact of a steadily creeping southward of the Mongolian deserts might be cited. The once rich provinces of Shensi and Shansi appear to suffer most from this inroad of chronic desiccation with its resulting famines. Since about 1845 there has been a steady decrease in the population of the provinces bordering on the deserts, namely, Shansi, Shensi, in Kan-su and Chili. No doubt this has been due some measure to other causes, such as the Taiping rebellion and other political disorders. But the probabilities are that the cultivatable area in these provinces is steadily shrinking, and has in a great degree been caused by the destruction of the protecting forests. In this connection we have some grounds for an interesting speculation as to whether or not certain well-developed facts warrant the belief that much of the territory now desert was a habitable and fertile country in historic times. It is not possible to discuss the subject in this paper, save to say that unmistakable evidences of a comparatively high civilization have recently been discovered in the midst of what are now and apparently have long been hopelessly desert areas. It may, perhaps, be going too far to assume that the climatic changes which have brought about such results have been entirely due to deforestation. The probabilities are that other forces have been at work, but until the problem has been intelligently studied, it is hopeless to attempt its solution. Careful and scientific observations of rainfall, flow of streams, etc., have yet to be made in China. It is only at Shanghai and Hong-Kong that meteorological data covering any considerable period of years have been accumulated.

Marco Polo speaks of the Yangtse River as being thickly wooded in places where a tree is not now to be seen for miles. According to the naturalist Pratt, there are now no trees worth felling in the Yangtse valley within any distance of a stream that might be used for logging.

Another naturalist, Père Amand David, cannot believe this reckless destruction of the forests which characterizes the march of Chinese civilization to be altogether due to the need of firewood. He attributes it rather to the fear of wild beasts and a desire to destroy any cover for them. In Szechuen and in a number of other provinces of the Yangtse drainage area, the natives mine and use considerable quantities of coal. Where this is abundant and cheap, it is not likely they are under much stress for fuel, as is the case in the "Great Plain," and along the banks of the Yellow River below Kai-fung-fu. The theory of Père David's may, therefore, be correct, for the Chinese, as a rule, certainly have great fear of the tigers that are usually found in the wilder parts of China.

It is rather remarkable that so practical a people as the Chinese should not have long ago recognized the many advantages of forest culture, that is, in the sense of raising trees as an agricultural product. It seems, however, in some localities, notably in Hunan province, attempts have been made at replanting the hillsides with ordinary timber trees. But this is quite exceptional, for, as a rule, only those trees are considered worth growing that yield a comparatively quick return or harvest. The yield of the varnish tree (*Rus vernicifera*), the camphor (*Cinnamomum camphora*), mulberry (*Morus alba*), mountain oak (*Quercus esculus*), and the bamboo (*Bambusa*), form a large part of the natural products of China,

the mulberry being, of course, used in silk culture, as is likewise the mountain oak.

The usual Chinese system of cultivation, by means of terraced fields rising one above the other up the side of a hill or even mountain, does certainly tend to check erosion. These systems of terraced paddy fields are generally placed, where possible, athwart the course of small streams.

The French use barriers of a similar kind especially constituted to check erosion, and enable the soil to accumulate on steep hillsides in sufficient quantity to give foothold and sustenance to trees. In China, one often sees, especially in those provinces ravished by the Taiping rebellion, abandoned fields of this kind covered with small trees or bushes, showing thus that the hillsides could be easily planted with trees were it possible to give up their use for agriculture.

It has been estimated under normal conditions, in well-forested areas, that about one-sixth to one-third of the whole rainfall flows off into the sea, the five-sixths or two-thirds sinking into the earth, where it is conserved to supply springs and wells. According to Chinese historical records, the climate of northern China has undoubedly moderated considerably from what it was some centuries ago. This has been correctly attributed to the effects of deforestation. While the total annual precipitation has probably not greatly decreased, it is unevenly distributed, drought follows flood, and there are distinctive wet and dry seasons that are unusual in a temperate climate in much the same latitude as Philadelphia, and surrounded on three sides by the sea.

The Tennessee Forest Association.

THE initial meeting of the Tennessee Forest Association was held at Sewanee on August 7th. Prof. Charles A. Keffer, of the University of Tennessee, was chosen temporary Chairman, and Mr. Percy Brown, of Spring Hill, Secretary. The Chairman spoke of the forest resources and possibilities of Tennessee, of the necessity for some action toward preventing their dissipation, and of the work an association like that contemplated could do. Letters from absent well-wishers were then read. Gov. McMillin wrote: "Tennessee is more blessed with forests than many of the older States of the Union, and we ought by every means to husband them and encourage the growth of new ones. I wish you the most abundant success in this work, and I want you to rest assured that I will gladly serve you in the future in whatever way I can." Mr. R. W. Powell, President of the Powell Lumber and Mining Company, of Westel, told of his personal experience in dealing with the problems of forest and water supply in the Sequatchie valley. Maj. G. R. Fairbanks, of Florida, spoke of conditions in his State, and outlined the work being done by the horticultural societies there in order to stimulate an interest in forest preservation. Dr. B. L. Wiggins, Vice-Chancellor of the University of the South, made a few remarks regarding the lively interest in forestry taken by the University. Mr. John Foley was called on for information regarding the forest management at Sewanee. He described the forest conditions, discussed the effects of fire, grazing and past management, and outlined a scheme for the betterment of the tract.

The afternoon session was devoted to considering the Constitution drafted by the Committee, and to the election of officers. A permanent organization was effected, with the following officers: President, Dr. B. J. Ranage, of Sewanee; Vice-President for East Tennessee, Prof. Chas. A. Keffer, of Knoxville; Vice-President for Middle Tennessee, Mr. J. H. Baird, of Nashville; Secretary and Treasurer, Dr. W. B. Hall, of Sewanee.

The object of the Tennessee Forest Association is "to secure and maintain a due proportion of forest area throughout the State; to disseminate information concerning the growth, protection, and utilization of forests; to show the great evils resulting from forest destruction, in the decrease and unequal distribution of the available water supplies, the impoverishment of the soil, and the injury to various industries; to secure the enactment by the Legislature of such Laws, and the enforcement of the same, as shall tend to increase and preserve the forests of the State."

As Col. Killebrew said: "It is a subject in which everybody should be very much interested, and I do not believe there is any question now before the public that demands more attention than the preservation of our Southern forests. The rapidity with which the timber is disappearing is so serious that I am inclined to believe that it will injuriously affect our future prosperity more than anything else. Intelligent men all over the South should take up this question and adopt such measures as may lead to the preservation of our forest wealth."

It is the hope of the Association to make clear the disastrous effects of forest denudation, and in this way procure the introduction of conservative methods of handling forest lands. The lumber men and landowners of the State are expected to see the advantage of forestry over the usual destructive lumbering, and to so manage their lands that they may be a constant source of revenue.

The next meeting will be held in Nashville, in November.

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, One dollar.

Life membership, Fifteen dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to *A. B. Weimer*, Chairman Membership Committee, 512 Walnut Street, Phila.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

FOLLOWING precedent, the issue of FOREST LEAVES has been delayed to give to the members of the Pennsylvania Forestry Association opportunity to have promptly the proceedings of the Annual Meeting. They will find in the address of the President, the reports of the General Secretary, the Secretary of the Council and of the Treasurer, statements covering the work of the Association, which are very encouraging. We also give liberal space to the presentation of the portion of the message of the President of the United States in which he takes decidedly strong ground in favor of forest reservations. Whether his recommendation to combine the entire forest reservation in one Bureau is the best will undoubtedly be discussed by Congress. It would be a pity if anything should be done which would lessen the chances of completing the excellent surveys which are being carried on under the direction of the United States Geological Survey. These, when mapped, give to investors and others excellent opportunities to judge of the topographical and physical features of various parts of the country. At all events, it is certain that the President appreciates the importance of forests as conservators of the water supply, and the value which this water has for irrigation, power, and other purposes. J. B.

* * * * *

A well-attended convention, at which was discussed the "Preservation of Forests, Fish and Game," and the action necessary to be taken, was held at the Exposition of the International Forest, Fish and Game Association of Pennsylvania on Friday evening, December 6th. Several well-known speakers addressed the meeting, treating various phases of this interesting subject, and on another page will be found a detailed description of the proceedings.

Narrative of Annual Meeting of the Pennsylvania Forestry Association.

THE annual meeting of the Pennsylvania Forestry Association for the election of officers, presentation of reports and the transaction of business was held at its room, 1012 Walnut Street, on Monday, December 9th, at 3.30 P.M. President John Birkinbine in the chair.

After the meeting was called to order, the minutes of the last annual meeting were read and approved.

The President then presented his Annual Address, which was followed by the reports of the General Secretary, Treasurer and Council, which are given in full in this issue.

The President appointed Messrs. Howard A. Chase and Alfred Gaskill tellers of election, who, after collecting ballots, announced that the following officers had been unanimously elected to serve during the coming year:

President, John Birkinbine.
Vice-Presidents, Wm. S. Harvey,
James C. Haydon,
Howard M. Jenkins,
Albert Lewis,
Richard Wood.
General Secretary, Dr. Joseph T. Rothrock.
Corresponding Secretary, Mrs. John P. Lundy.
Recording Secretary, F. L. Bitler.
Treasurer, Charles E. Pancoast.

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Wyoming County, James W. Piatt.
York County, Dr. I. C. Gable.

A preamble and resolution endorsing the proposed Appalachian National Park were discussed and referred to Council with favorable recommendation.

Dr. Bushrod W. James spoke of the practice pursued in cities of the mutilation of trees (so-called pruning) by cutting off the large limbs, leaving only the stumps, often resulting in the loss of the trees. He instanced a row of shade trees which had been butchered in this way. The discussion was participated in by Dr. J. T. Rothrock, Mrs. Geo. T. Heston, Mr. John E. DuBois, Mr. John Birkinbine and Mr. Alfred Gaskill.

Dr. James presented the following motion, which was adopted:

"The Pennsylvania Forestry Association recommends that the people of Philadelphia and other cities protect trees by preventing the cutting of the larger limbs."

In answer to a question, Dr. Rothrock stated that the parties starting forest fires in Centre County had been sentenced to six months' imprisonment. Mr. John Birkinbine said that the great difficuly was not with the laws in regard to forest fires, but in securing their proper enforcement, as the officers were not anxious to punish forest-fire offenders. He instanced a case in Huntingdon County, where a company owning large areas of timber land brought suit against some timber thieves, and the jury placed the cost on the plaintiffs. Dr. Rothrock said that in Mifflin County the citizens knew who started forest fires, but were afraid to inform on them because they feared their barns or houses would be burnt. He had placed a detective there, and in forty-eight hours had imprisoned the offenders, who were promptly tried in another section of the county and sentenced, although not heavily. In McKean County some boys started a forest fire in the endeavor to get a woodchuck; and when brought to justice the commissioner wished to know if the boys caught the woodchuck. In one day, after a series of forest fires, ten offenders were captured.

President's Address, Pennsylvania Forestry Association.

EVIDENCES of constantly increasing interest on the part of the general public are seen in the many instances of recognition given the movement to protect our forests. The press, by its practically unanimous approval of the efforts made, has been a most potent ally, and the legislation obtained has placed Pennsylvania well in the front as to forest protection. Our forest reserve is growing and has already assumed considerable magnitude. As shown by the Secretary's report, the total area now under the control of the Commission exceeds 325,000 acres.

The Forestry Department is an accepted feature of the State government, recognized as such, the same as any other department. The forestry laws which were passed are, with a few exceptions, sufficient, and minor modifications will give full protection to our reserves and to the growing forests. We have the largest forestry association in the country; it has been in existence for fifteen years, the interest of its members having been such as to insure at all times sufficient funds to meet any obligations.

The friends of forestry in this State have been extremely fortunate in having the co-operation of several of its chief executives, and it is a gratification to be able to commend the cordiality with which Governor Stone has evidenced his interest in forest protection.

We also recognize the position taken by President Roosevelt in his message to Congress. He not only urges the protection of forests and the maintenance of increased reservations, but draws particular attention to the reclamation of arid lands as a factor closely related to forest preservation.

When those who have been active in the forestry movement for nearly two decades recall how little interest their efforts excited, and compare this with the position at present, when the chief executives of the Nation and of a number of the States and the best representatives of our press are pronounced in advocacy of forest protection and preservation, when a large national association and strong associations in several of the States are active, when the establishment of forest reservations is fostered on a liberal scale by the general Government and by States, there is surely reason to feel encouraged that our purpose is nearing accomplishment.

Under such a presentation, the friends of forestry may feel gratified by the position which the movement occupies, and it will be to the interest of all who are connected with the organization to continue their efforts in hopes of obtaining still greater advances.

Having made such progress, the first essential is to hold the position obtained. This can only be done by vigilance and by continued activity. After we have secured reservations, the management of these must be perfected, additional reservations should be obtained, and public sentiment must be educated to encourage this. The cordial co-operation of the press will demand and should receive the recognition which such aid brings to our efforts. The Forestry Department should be encouraged, so that it becomes not only an important, but an interesting part of the State government. All friends of forestry must strenuously oppose any adverse legislation or tampering with laws, unless the changes suggested have been carefully considered and passed upon by those whose

interests are not inimical to the preservation and protection of our forests. The Association will need to be still further encouraged by additional members; in fact, number is the strength of the Association. The greater our membership, and the more widely it is distributed throughout the State, the greater will be its power—a power not to be used carelessly, but to be husbanded for such times as it may be necessary to call it into service, either to advance some effort to secure improved protection or to combat procedures which threaten the purpose for which it has been organized. It must, as in the past, be kept entirely free from political entanglement, or from any participation in factional strifes, and the whole purpose of the Association centered in the object for which it was formed. With the combined effort of the membership it can exert a most powerful influence for the benefit of the Commonwealth.

The roll of members, as reported by the Secretary of the Council, is truly encouraging; and yet a membership of 1630 in a community of 6,000,000 people represents too small a factor to indicate the real sentiment which exists. Our membership should be ten times what it is at present, and with such augmented members its influence would be even greater than the proportion would show.

During the year the attention of the Council has been called to the desirability of the Pennsylvania Forestry Association assuming control of groves in different parts of the State, which may be presented to it, so as to maintain them, either for historic or other reasons, as landscape features, and give to the neighborhoods in which they are located opportunity for wooded retreats. This proposal is now in the hands of a committee, receiving consideration, which must necessarily take time, because, after the property is deeded to the Association, the organization must assume control and maintenance.

The suggestions which come from the Forestry Department to establish schools of forestry, and also retreats for those suffering from pulmonary troubles, will surely command the attention of the State, and it is hoped that ultimately the plans which are now practically embryotic may be brought into condition for usefulness.

The statement which appears in the Secretary's report, that one-sixth of the entire area of the State could be advantageously devoted to forests, will show what a large field is open for those interested in preserving these natural and useful features. Dr. Rothrock speaks not only with authority, but from close personal investigation of almost every part of the Commonwealth, and those unfamiliar with the possibilities of a liberal forest policy in the State of Pennsylvania will undoubtedly be surprised that so large an area is better adapted for forest growth than for any other purpose. His appeal for the education of young men to become assistants in the forestry work should command attention, and open an avenue for a useful life to many who would be improved in health, advanced in knowledge, and made better citizens by their study of the possibilities of forest care and culture.

It is extremely gratifying to learn that the number of persons who are convicted and punished for being responsible for forest fires is on the increase, and it is sincerely to be desired that the officers of the peace and the courts should act promptly and decisively upon all complaints concerning such violations of the laws in a manner to show to the careless and the vicious that the State of Pennsylvania intends to preserve what is left of her valuable heritage.

With the increase of numbers and influence our responsibility is augmented, and it behooves us to watch that this influence and responsibility is not allowed to be used injudiciously or for any purpose of personal gain.

JOHN BIRKINBINE.

Report of the General Secretary.

WHEN the Pennsylvania Forestry Association was formed, it was for the purpose of creating a public sentiment which would lead to the purchase of large State Forest Reservations, and also to the more rational treatment of their own woodland holdings by the citizens of this State.

Both of these objects have in part been attained. The State is now practically in possession of more than 325,000 acres. This would represent an area of about twenty-two and a half miles square, which is an insignificant portion of the area of the State. In order to show just what this area represents of the State's surface, I place before you this map of Pennsylvania. (A map was here shown.) The smaller interior square is what we have; the larger square, enclosing the smaller one, is what we ought to have.

It is not to be supposed that the State Reservations should be located where they are shown on the map. I have simply intended to indicate the proportionate areas which the State has and should possess, and, in order to express this better, have outlined the ideal reservation in the middle of the Commonwealth.

I have seen, I suppose, as much of Pennsylvania as most of our citizens have, and on the strength of what I have seen do not hesitate to affirm my belief that at least one-sixth of the State should be devoted to forests. Not only would no private interests be interfered with, but an actual larger revenue would come to the State, and the interests of all our citizens would be better guarded.

So much for the public aspect of this portion of the forestry problem. It gives me pleasure to say that the attention of individual landowners is becoming more than ever drawn to a rational treatment of their woodlands. Nothing shows this better than the fact that there never were so many inquiries made of the Department of Forestry, bearing upon methods of forest protection and restoration, as now.

Already two promising starts have been made in Luzerne County—one where General Oliver has about 100,000 young white pine trees growing. The other is at Glen Summit, where, I am reliably informed, another plantation has been started. I am not, however, fully informed as to the details of the latter.

Work to be done remains to be considered. I shall omit everything under this head except two subjects. First, education in forestry. Second, forest fires. In what follows I have no desire to suggest any improvement upon the several schools of forestry which are now in successful operation in this country, and all of which are doing good work.

The State, however, in acquiring land, developed at the same time a problem for itself. That land must be cared for, else it had as well never been purchased. How shall this be done? The men who can be trusted with the details of the work are not available. It must not only be done, but it must be done at a minimum of expense, and at the same time an expectant public will look for the speediest and best results.

There is no way by which this work can be done except by outlay of money. Expenditure is inseparable from the problem. There are, however, two aspects to the question. One is, to go on forever hiring untrained and often irresponsible labor, which has no interest in the work. The other is to select young men who are anxious to rise above the rank of a day laborer, and enable them to gratify their ambition in return for services rendered the Commonwealth. Briefly, I think the wisest policy of the State is to educate its own foresters on its own ground, and secure the labor for the betterment of the reservations. Let work and study go together!

Fortunately, the Commonwealth is in a position to do this at small cost. It already owns all the buildings that are requisite for the work. The plan I now have in mind was launched in the last issue of FOREST LEAVES. It appears to have commended itself to the public press of the State, if one may judge from the number of kind commendatory notices it has received.

Briefly, it may be restated here. It is proposed to select, by competitive examination, twenty young men who have a fair English education at least, then submit them to a physical examination to ascertain whether or not they have the ability to endure the rugged life of a forester. Once accepted, these men shall receive three days' instruction each week, their boarding and clothing, on condition that they work faithfully under the direction of the forester three days out of each week on the improvement of the State lands; and on condition, also, that they furnish acceptable bonds to reimburse the Commonwealth for what money has been expended on them if they fail to pass their examinations, or are discharged for any misconduct. It is proposed that this bond shall be for two years. During this period the young men shall be instructed in book-keeping, forest laws, road making, surveying (including leveling), etc.

During this time they would have done improvement work in opening fire lanes, and also fighting fires, repairing, laying out and making roads, preparing nurseries, raising seedling forest trees and transplanting them, and thinning out superabundant or undesirable saplings and matured or declining trees. Let it be understood here that this plan does not contemplate retaining a single man who cannot, or will not, earn for the State what it costs to educate him. He must know what a day's work is, and thus be competent to direct the work of a gang of laborers, of which he may later on be placed in charge.

At the expiration of two years the bond is to be renewed, and those who have passed their examinations are to be promoted from forestry apprentices to the rank of forestry cadets. Their labor is now, to a certain extent, skilled, and will merit recognition by better quarters and a more liberal allowance for clothing. Their studies will be, making estimates of annual production of timber, relations of light and shade in forest culture, preparing working-plans for the State grounds, and aiding to direct the labors of the underclass men and working gangs. Their instructions will also embrace botany, zoology, and especially entomology, and some chemistry and geology. But every aspect of every study is, like the work, to be as practical as possible. And every man after his second year should be granted the power of a peace officer, to arrest those who are violating the forest or game laws of the State, or who are trespassing on the State Reservations.

Those who successfully pass their examination at the end of the fourth year should be ranked as assistant foresters.

This is but the outline of the plan as far as I have developed it. There is much more to be said, but probably nothing more is required to enable you to ascertain whether or not you can approve of it. If you can, then I ask you to endeavor to help mature public sentiment in its favor.

There is, however, one aspect of the problem which must be considered. Do not load the plan with any unnecessary details or evolve any complicated system of study. If you do, you will surely fail to secure authority to do any educational work at all. This school is not to be considered as a college, or in any way to do the work of or antagonize other colleges. It is simply to provide for the State, as soon as possible, a body of men who can guard and improve the State's forest holdings, and to have the work take effect at once.

I will now briefly consider forest fires. So long as unprincipled men or careless men carry matches into the woods in spring or autumn, fires will be started. Therefore, there are three things to do: First, to suppress the fires. Second, to punish the guilty. Third, to instruct the careless.

Germany's great forester, Sir Dietrich Brandis, in a letter to me, advises that the State Department of Forestry should not concern itself with the suppression of fires on private lands, nor should it even seek out those who start them. He thinks that it should limit its responsibility to care of State lands. Under ideal forestry conditions I am sure he is right. But we here, so far as forestry is concerned, are not living under such conditions. The public require protection from a source which will be more free from local friends and foes than the county officials. It is safe to say that a great change has been wrought in the past four years in public sentiment. We still have forest fires, and probably to a certain extent always will have them, but public sentiment is surely crystallizing against those who cause them.

This is not the proper place to go into details of State work. These will be fully considered in my official annual report to the Governor and the State. It is enough that I say here that, in my opinion, these fires, which prevent natural restoration of timber, can in the near future be largely prevented. Each year there are more and more cases of punishment of guilty parties. This will produce its natural results.

I desire here to call attention to the effort being made by some public-spirited persons in the State to test the value of out-door life on the State Forest Reservations upon those who are threatened with pulmonary troubles, or who are in any way physically below par. The past season we have had four persons under care and observation. The result has, in every instance, been eminently gratifying. The isolation of the cases has rendered medical assistance difficult to obtain. Fortunately, but little aid of this kind has been required.

To the public press of the State I wish here to extend my hearty thanks for their constant aid and helpful suggestions. Without the help so liberally given it would have been impossible to have made the advances in our work which the year past has witnessed.

It should also be recorded here that to His Excellency, Governor Stone, and to the Legislature, this Association is indebted for cordial co-operation, and for wise direction in framing and securing the enactment of a law which created the Department of Forestry. It is confidently expected that other States, and even the general government, will follow the example.

The Forestry Commission created under this act has pursued its duties steadily and with a singular unanimity. There has been but one desire among its members, namely, to accomplish the largest measure of good for the State. I can honestly say, for my colleagues, that a more self-sacrificing and unselfish Commission could not be found. We regret that our esteemed fellow-member, Mr. Albert Lewis, found that the pressure of his large business operations necessitated his resignation from the State Forestry Reservation Commission. It is, however, a matter for congratulation that Miss M. L. Dock was appointed as his successor when Mr. Lewis felt he could no longer give us the benefit of his presence.

Miss Dock's appointment was a merited tribute to her zeal in and knowledge of forestry, and was also a happy recognition by the Governor of the interest the women of the State have taken in the protection and restoration of our woodland areas.

I beg leave here to call attention to the fact that to our President, Mr. John Birkinbine, the Association owes a large measure of indebtedness. His presence at Council Meetings has often been at cost of valuable time and effort. Year after year he has continued to give us the benefit of his best thought, both as President and Editor-in-Chief of FOREST LEAVES. The same may be said of those who for so many years have rendered time-consuming service as Treasurer and on the Membership, Work and other committees.

The work accomplished is not small, nor have the labors required been slight.

There is much more which I would like to say, but time forbids.

J. T. ROTHROCK,
General Secretary.

Report of Council of the Pennsylvania Forestry Association.

IN the year which has passed the forestry cause has been materially advanced in the State of Pennsylvania.

House Bill 24, creating a Department of Forestry, was approved and advocated by the Pennsylvania Forestry Association, passed by the Legislature, signed by the Governor, and became a law. The prompt selection of our General Secretary, so well fitted for this office as Forestry Commissioner, was gratifying to all friends of forestry.

This law also included a State Forestry Reservation Commission, having the power not only to purchase forest lands for reserves, but also to manage and care for them, so that these reserves will become, it is hoped, a source of revenue to the Commonwealth The old Forestry Reservation Commission was reappointed. We regret the withdrawal of Mr. Albert Lewis from the Commission, and congratulate Miss Myra L. Dock on her appointment.

In his annual message Governor Stone advocated the purchase of additional lands for forest reservations, and during the present year large areas have been added from time to time, one especially desirable one being the Mont Alto and Caledonia tracts of 44,000 acres, the grand total now owned aggregating over 325,000 acres.

Laws were also introduced in the Legislature providing for a rebate of certain taxes on timber land; authorizing the planting of shade trees along public streets; to encourage the planting of roadside trees, with a certain amount of rebate of taxes for so doing; and an act for the better protection of timber land against fire, etc.

During the winter of 1900–01 the Conference Committees of the Pennsylvania Fish Protective Association, the Game Association, the Health Association and the Pennsylvania Forestry Association held a number of meetings, and the cordial co-operation of these organizations, whose aims are dependent on the preservation of the forests, was assured.

The subject of amending the Charter of the Pennsylvania Forestry Association so as to enable it to own ground for park purposes in various sections of the State, provided no financial liability was incurred, was thoroughly discussed, and is now in the hands of a special committee for action.

Two most important decisions were rendered by the Superior Court of Pennsylvania during the year upholding the laws making it a punishable offence for telegraph, telephone or electric light companies to cut or mutilate trees for the passage of their wires.

Important convictions of persons who started forest fires were also secured, and it is hoped this will do much to lessen this great menace to our remaining timber land. A person who wilfully sets fire to a forest should be as promptly hunted down and brought to justice as one who causes a house or barn to be burned.

Arbor Days, both spring and fall, have been quite generally observed throughout the State, and the press has given most cordial co-operation.

At the last annual meeting there were on the roll 1551 members. Since then we have lost, through resignations and persons being dropped, 46, and regret to chronicle the decease of 19 members. In this period 143 persons have united with the Association and one reinstated, making a net gain of 79, or over 5 per cent., the total membership being 1630.

Forestry meetings have been held in New England, New Jersey, Colorado, and many other States, while Tennessee has started a State Forestry Association, and much more interest is being taken by the general public.

Just before his death the late President McKinley said: "Let me see the trees; they are so beautiful." This fact should not be lost sight of in the proposed memorials to our lamented President. What could be more appropriate than memorial groves, parks and forest reserves, where the public, to whose service he devoted so many of the best years of his life, could "see the trees," besides reaping the many benefits which the forests bestow.

F. L. BITLER,
Secretary.

In addition to more than a million and a half acres of private forest land in the South, the Bureau of Forestry of the U. S. Department of Agriculture has requests for the handling of more than 2,500,000 acres in other sections. Added to this are nearly 50,000,000 acres of United States forest reserves and State lands, for which the Bureau is asked for technical assistance from time to time.

Wild Yellow or Red Plum. (Prunus Americana, Marshall.)

THIS small tree is usually characterized by its rugged aspect. One can generally distinguish it at a distance by this peculiarity before he is close enough to recognize its minuter features. In Pennsylvania the wild plum grows in abandoned, somewhat moist fence corners; and while it can hardly be said to have any commercial value, it, on the other hand, seldom intrudes upon or takes the space where more desirable trees would be likely to grow.

In its forest condition this tree, which seldom here exceeds twenty-five feet high, and a foot in diameter, seems to prefer rich river or creek flats, or the points somewhat higher, where the alluvium and gravel or clay soil join. The fruit, when well ripened, is not unpleasant, being a somewhat unusual combination of sweet, sour and spiciness. It is about three-fourths of an inch in length, oblong in shape, and of a reddish orange color.

Dr. Darlington, whose observations can usually be trusted, says that the fruit is improved by cultivation.

The tree ranges in habitat from the valley of the Saint Lawrence west to Lake Manitoba and Colorado, and is found as far south as Florida and Texas. I know of no use for the wood, though Sargent says that it is used for the handles of tools.

Its physical properties are: specific gravity, 0.7215; percentage of ash, 0.18; relative approximate fuel value, 0.7202; weight in pounds of a cubic foot of dry wood, 44.96; relative strength, 107.

The Washington Thorn. (Cratægus cordata (Mill.), Ait.)

THIS tree is not a native of Pennsylvania. Dr. Darlington says of it in "Flora Cestrica," edition of 1837, that it was introduced to Chester County from the neighborhood of Washington about the commencement of the present century as a hedge plant. It grows rapidly, but is, in reality, not so good for hedges as the Cock Spur Thorn. The mature, purple fruit is rather attractive in autumn.

The wood is hard and heavy. Its physical properties are: specific gravity, 0.7293; percentage of ash, 0.46; relative proximate fuel value, 0.7259; weight in pounds of a cubic foot of dry wood, 45.45.

Treasurer's Report.

The following is the financial statement of the Pennsylvania Forestry Association for the year ending November 30, 1901.

	Dr.
To balance on hand December 1, 1900,	$68 03
Cash, annual dues to November 30, 1901,	1171 35
Cash, donations and subscriptions,	1088 00
Cash, Life Memberships,	450 00
Cash, sale FOREST LEAVES and advertisements,	117 86
Cash, rent and office expenses paid by City Parks Association and Women's Sanitary League,	198 13
Cash, dues from Country Branches,	27 50
	$3120 87

	Cr.
By cash Publication FOREST LEAVES,	$939 94
" sundries, office rent, etc.,	388 83
Assistant Secretary's salary,	600 00
Life Membership account,	450 00
Lectures and meetings,	59 65
Expenses Membership Committee,	145 00
" Conference Committee,	21 45
Contribution for trees at Stenton,	18 00
Balance on hand December 2,	498 00
	$3120 87

CHARLES E. PANCOAST,
Treasurer.

How Fungi Gain Entrance to Living Trees.

PRIOR to the advent of the Twentieth Century, the forestry movement in the United States was purely an educational one. But with the establishment of schools of forestry at Yale and Cornell Universities, the creation of the Bureau of Forestry in the United States Department of Agriculture, the inauguration of the Department of Forestry in Pennsylvania, the setting apart of national timber reserves in the far west and state reservations in New York and Pennsylvania, and the erection of private forests, as at Biltmore, N. C., the era of scientific forestry may be said to have been entered upon. There is no longer any question as to the importance of conserving and perpetuating our forest wealth. Lumbermen themselves begin to see the end of the present timber supplies, and many of them are earnestly in favor of more economical methods of cutting. With the establishment of a rational system of forestry, many questions of forest practice will press upon the scientific forester for solution. None of these problems is of more practical interest than the diseases of trees. What diseases are frequent? How can the destructive

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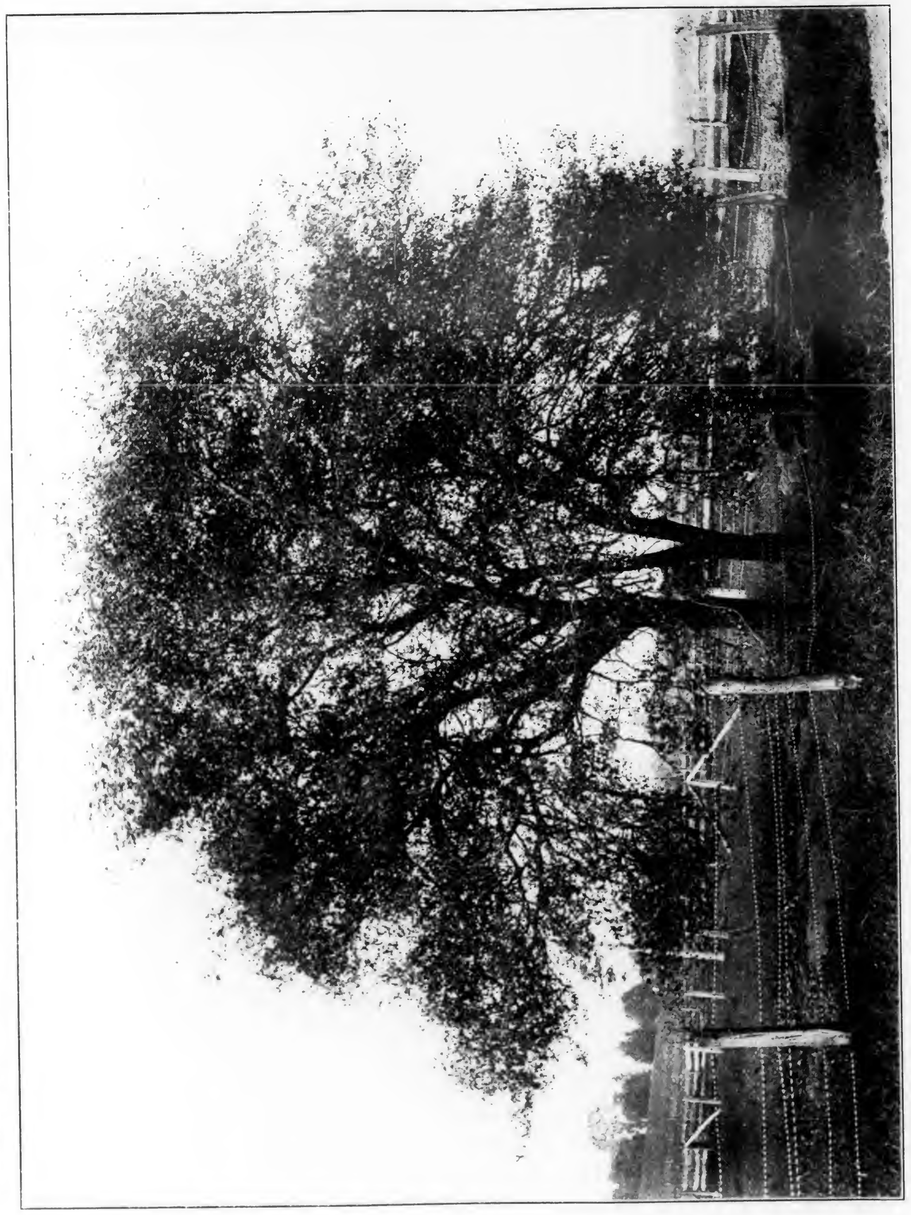
WASHINGTON THORN. (CRATÆGUS CORDATA, AIT.). CULTIVATED.
CHESTER COUNTY, PENNSYLVANIA.

WILD YELLOW OR RED PLUM. (PRUNUS AMERICANA, MARSHALL.)
CHESTER COUNTY, PENNSYLVANIA.

BY J. T. ROTHROCK.



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WILD YELLOW OR RED PLUM. (PRUNUS AMERICANA, MARSHALL.)
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INTENTIONAL SECOND EXPOSURE

agents be combated? How can the forest be preserved? These are some of the questions that must be studied and answered.

As a contribution to the economic discussion of timber diseases, the writer wishes to present to the readers of FOREST LEAVES an enumeration of the ways in which destructive fungi gain access to the interior of healthy living trees. The description which follows is founded upon the personal observations and the experience of the writer, who desires to call attention to some heretofore neglected facts.

A fungus may be defined as a plant devoid of chlorophyll, hence dependent for existence on already organized material, dead or living, and reproducing by spores which are formed in a great variety of different kinds of fruit bodies. The bacteria, the moulds, the smuts, the rusts and plants of the mushroom type are fungi. All of these forms of vegetable life reproduce by a single-, or several-celled body, known as a spore, which is usually extremely light and small, only to be seen well under the higher powers of the microscope. The atmosphere near the surface of the earth contains in suspension, and floating about in it, millions upon millions of these minute spores or reproductive cells. If proper conditions of moisture, heat and food are provided, these spores germinate and produce a feeding portion of fine threads, called hyphæ (singular, hypha), and these hyphæ massed together in, or on, any nutritive medium constitute a mycelium. From the mycelium, later, arise the fruit bodies bearing the spores.

Fungi gain entrance to the interior of plants in one of three ways: 1st. By the growth of spores, or hyphæ, through the transpiration (breathing) pores (stomata) and water stomata, or by growth through the epidermal tissues of leaves or parts of seedling plants by ferment action. 2d. Through the seed itself, the mycelium of the fungus living inside the seed, giving rise to an increased growth when the seed develops a tender, susceptible plantlet. 3d. Through an injury produced by mechanical, meteorological, or other cause.

A large number of fungi enter living plants by their spores falling upon actively assimilating leaves, where they germinate and grow down into the interior through the minute transpiration, or water-pores. Once a mycelium has developed in the loose cellular tissue of a leaf, it is comparatively easy for it to penetrate deeper into the woody stem. The white rust of crucifers (*Cystopus candidus*) begins as a spore which sprouts on the epidermis of the plant and sends a hypha through a stoma into the tissues beneath. In the second instance, the hyphal tube secretes a cellulose dissolving ferment, and thus the fungus makes for itself a path into the interior. A disease of the English maple, due to a fungus (*Septoglœum hartigianum*), is an illustration of this method of entry. The disease almost always confines itself to the youngest shoots. When the spores of the parasite come into contact with a young shoot, they germinate within a few hours, and the mycelium bores its way into the host. Ward's lily fungus also demonstrates the same habit of growth.

Occasionally the planted seed contains a dormant fungus, which begins its growth as soon as the seedling plant emerges. The oat- or wheat-smut spores are produced in the grain itself, and the smut fungus consequently infests the cereal plant when it is small, and at or near the surface of the ground. That this disease is not a transmitted one is shown by the behavior of the fungus in the seed and the seedling plant. A transmission, by inheritance, of diseases to descendants is unknown in the vegetable kingdom.

Fungi chiefly gain entrance to plants by injured areas caused by mechanical, meteorological, chemical, or other agencies. Mechanical injuries owe their origin to man or beast. Squirrels in search of food bite off the twigs of trees. Deer and moose browse upon the tender branches and bark of various trees. The writer has seen in the Maine woods, on Mt. Katahdin, a large number of trees of mountain ash (round wood, moose wood, *Pyrus americana*) that had been deprived of strips of their bark by the teeth of the moose that roamed there. Ernest Seton-Thompson has described in his "Biography of a Grizzly" the manner in which bears destroy the bark of trees by rubbing against them. Rodents and moles peel off the outer protective layers of roots as food, or as a material with which to line their burrows. Such fungous mycelia as the *Rhizoctoniæ* (ramifying strands) of the oak-root fungus (*Rosellinia quercina*), which live in and penetrate the soil, can find an easy entrance into roots decorticated by field mice and gophers. In the case of the toadstool (*Armillaria* (*Agaricus*) *mellea*), mycelial strands in the form of rhizomorphs grow through the soil, and can easily enter such gnawed healthy roots. Beavers are active agents in cutting down trees and removing the bark therefrom. Birds, such as the woodpecker, drill holes into apparently sound timber. Wood-boring insects (Family, *Scolytidæ*; genera, *Dendroctonus, Scolytus, Tomicus*, etc.,) are also responsible agents in the destruction of trees. The black parent beetles of the "fruit-bark beetle" (*Scolytus rugulosus*) appear in early spring and bore little round holes through the bark to the sap-wood. They then

make a central burrow, on each side of which little notches are made to receive the soft white eggs. The larvæ hatch very soon and begin to make little burrows of their own. It is an easy thing for spores of destructive timber fungi to be washed or blown into the channels thus formed. Horses also do much damage, if carelessly hitched to trees, in that they remove the bark by means of their sharp incisor teeth. Wherever a wound occurs, there a favorable spot is provided for the lodgment and germination of fungous spores that may give rise to a mycelium which each year penetrates deeper and deeper into the heart of the tree, until it becomes rotten to the core and topples over by its own weight, or by being blown down during a storm of wind.

Man has caused untold injury to the forest. Telegraph wires, stretched in every direction, rub against the trunks and limbs of trees until the bark is completely removed, inviting the entrance of destructive fungi. Electric wires, if not properly insulated, may burn holes into trees. A beautiful poplar tree standing before the writer's residence in Philadelphia was somewhat injured in this way. Many trees in our large cities are planted too close to the curb, and the wheels of passing wagons tear off the bark close to the ground. Farmers in plowing injure the roots of trees. In hoeing and mowing they frequently destroy promising young saplings in their careless disregard for future arboreal treasures. The blazing of trees by surveyors leads occasionally to the death of a tree, if a fungus finds its way into the interior before the healing callus begins to form. The wasteful methods of American lumbermen destroy entire forests of saplings by fungous diseases, induced by wounds formed in the felling of the maturer specimens. Careless transplanting is another source of danger to young plants, if the roots are seriously damaged (see *ante*). Pruning, if properly done, is beneficial; but if too much wood is removed the process of healing never really takes place, and the trees thus slashed become the easy prey of fungous parasites. Fires should also be mentioned in this connection, because millions of dollars worth of forest property goes up in clouds of smoke every year. Occasionally the driving of a nail or a spike destroys a tree. The abrasion of twigs by the fall of the heavy fruit striking against them, or the combined weight of the fruit in breaking the limbs from trees, induce parasitic maladies.

The injuries produced by meteorological causes are such as are due to the action of the sun, the wind, snow, ice, hail, lightning and frost. Entire forests have been levelled by tornadoes, but usually the action of the wind is not so severe. In ordinary winds or storms limbs are bent down or broken off. Cracks are produced by wind action. Trees and limbs swayed by the wind rub against each other until the bark may be rubbed off. Whatever kind of damage is done, the exposed area invites the attack of fungous enemies, and the subsequent history of such trees clearly proves that the disorder in nearly all cases started at the injured surface. Lightning strokes also open the way for fungi to enter. The historic Playwicky Oak, near Wrightstown, Bucks County, was struck by lightning several years ago, and, although still sound, yet in the large crack formed by the electric discharge there is opened a way into the sound heartwood of the tree, which is still in an undiseased condition. Snow and ice frequently weigh down and snap off limbs, or the tree itself, if a young one, may be borne to the ground. Large hailstones, (as big as hens' eggs) may abrade the surface of trees, which may also be subjected to sun-burn or cracked through frost action.

Chemicals may be classified as rather exceptional destructive agents to trees. The gas from large factories, sewers, or from locomotives, brings about a diseased condition of trees that may be followed by the destructive action of fungi. Chemicals thrown about the roots of trees may work to the same end. The best illustration of chemical injury to trees known to the writer is that done to the trees growing near the hot springs, geysers and fumaroles in the Yellowstone National Park, as observed by him in the summer of 1897. Here the activity of the gases and chemicals held in solution is most marked. The trees near the outlets of many springs are either dead or dying, and many of them have been completely petrified or agatized by the absorption of various chemical salts.

Several other sources of injury to trees, hardly classifiable with the above, may be mentioned. The insertion of diseased buds or grafts into healthy trees may be the means of communicating the diseases of the scion or bud to the stock upon which it is placed. We find frequently in nature that two trees have been grafted together. If one of them is diseased, the disease may be communicated through the natural graft union to the other. Professor Robert Hartig mentions such a graft union of a diseased and a healthy root in the case of the red rot fungus (*Trametes radiciperda*), the most dangerous enemy of spruce and pine plantations. Here contact of the diseased root containing the fungus with the sound root of a neighboring tree is necessary in order that the latter may be penetrated by the mycelium of the former.

Let us enumerate, in conclusion, by means of a table, the facts that have been mentioned in the above discussion.

Infection by the Natural Growth of a Fungus	I.	(A)	By means of spores, or hyphæ, into the stomata and water stomata.
		(B)	By ferment action of a fungus on the epidermis of the host.
	II.		By developing from a dormant state in the seed into an active state in the seedling.
Infection through	I. Mechanical Injuries induced by		Beasts.
			Man.
			Fall of Fruit.
			Combined Weight Action of Fruit.
	II. Meteorological Injuries induced by		Wind.
			Snow.
			Ice.
			Hail.
			Lightning.
			Sun.
			Frost.
	III. Chemical Injuries induced by		Factory Gases.
			Sewer gases.
			Locomotive Gases.
			Chemicals at Roots.
			Alkali Soils.
			Gases and Chemicals in Geysers, etc.
	IV. Non-classifiable Injuries induced by		Natural Grafting and Budding.

It is a wonder that trees reach maturity and a healthy, green old age, when we consider the above-mentioned frequent causes of injury and disease.

JOHN W. HARSHBERGER.

University of Pennsylvania.

Preservation of Forests, Fish and Game.

THE International Forest, Fish and Game Association is holding an Exposition in Philadelphia, and the Pennsylvania Forestry Association has assisted this Exposition by preparing an exhibit composed of polished boards, exhibiting the grain of various woods, portions of trunks illustrating their value by sections taken at different angles, four cases of different species of woods native in the United States, a fine suite of views from the Department of Forestry of Pennsylvania (taken principally in the various forest reservations), and a number of beautiful transparencies of trees in North Carolina.

On Friday evening, December 6th, a convention was held at the Exposition, where prominent speakers addressed a large audience on various phases of the subject of the preservation of our forests and their wild denizens.

The meeting was presided over by Mr. Wm. S. Harvey, Vice-President of the Pennsylvania Forestry Association, who in opening said:

"Ladies and Gentlemen, and Associate Workers of the International Forest, Fish and Game Association: On behalf of the Board of Directors you have been invited to attend this conference in the interest of Forestry, Fish and Game. This International Association embraces membership from the Fish, Game and Forestry Associations, and many other leading and influential people, the associate membership now numbering 700. The primary object of this Association is to cultivate an interest in forestry and the preservation of our forests, for without the forests we would have no game, and the woods must be preserved to perpetuate our water supply. The game fish of our mountain streams are, therefore, dependent upon the forests. The Pennsylvania Forestry Association has, through its influence, which has been exercised without any political entanglements, and under the wise leadership of our distinguished Secretary, Dr. Rothrock, had enacted such wise and beneficent laws, so far-reaching and comprehensive, that not only the present generation, but generations to come, will be benefited, and this great Commonwealth has become the Keystone State in forestry legislation and enactments that are being adopted by other States, so that the entire country is being benefited by the intelligent effort of the advocates of forestry and the protection of fish and game."

Dr. J. T. Rothrock, Commissioner of Forestry for Pennsylvania, was introduced, and spoke of what had been done in our own State. He said: "It is a matter for great congratulation here that the forestry sentiment is so well matured that the creation of a Department of Forestry in the State government has been sanctioned by the thinking persons of all parties. I am glad, also, to say that I think the example of the State of Pennsylvania in this respect has not been lost sight of by several other States, and that it has furnished food for thought for the General Government itself. During the past three years we have acquired in this State over 325,000 acres of land as the nucleus for the State Forestry Reservations. This may seem like a large area, but if you take a map of Pennsylvania two feet and a quarter wide and about four feet long, the ground already purchased would be represented by a square on that map of about four inches. If you were to place this square in the centre of one of about fourteen inches, the larger square would represent what the State ought actually, in its own interests, to possess.

"If this area were given up to forestry, no other interest in the Commonwealth would suffer by it,

but every other interest would be aided. Some, indeed, would be saved from practical annihilation. All the Governors of the Commonwealth since the time of Governor Hartranft have recognized the necessity for this forestry movement. It was reserved, however, for the last three Executives of the State to give it practical shape and direction, and it is not too much to say that the interest taken by these gentlemen in the forestry movement will ever remain memorable features in their administrations.

"Governor Stone has insisted upon the utmost activity on the part of the Forestry Commission.

"What has already been accomplished is as nothing compared with what remains to be done. This land represents property, capital invested, from which a return is expected. There is but one way to safely manage such business matters, and that is on business principles. This land must be cared for, else it cannot produce the expected result. It is too late now in the history of the world to ask whether forestry pays. That question has been settled long ago in the affirmative. As an element of statecraft it ranks among the highest in Germany. The great need in this State to-day, so far as our forestry success is concerned, is skilled labor. There seems to be but one solution of the problem here. We must have the very best men we can secure, and, once secured, they must be retained so long as they render acceptable service. Governor Stone has repeatedly and wisely said that there should be no politics in forestry.

"In short, we must educate our foresters, and we must educate them on our own ground; and, since this is so, we should make their services to the State valuable enough to remunerate the State for the education these foresters receive. In my judgment, these young men should go through every grade of labor, practically from the lowest to the highest. If they cannot do this, we do not want them; and once they are educated, they should be sorted out for work according to their ability and fidelity.

"It should be recognized that forestry is a coming profession in this country, and that there will be work for a large number of properly trained men, not only in the State service, but in the private lands of the Commonwealth; and the more widely a knowledge of the principles of forestry can be diffused, the better the interests of the Commonwealth will be conserved.

"I desire to see a regular school of practical forestry established on the State ground. This is in no sense to take the place of any of our schools of forestry, or of any other educational institution. It is simply a measure of necessity for the Commonwealth. It is to supply manual labor for the State ground, and to make that labor as effective as possible; and whilst it aims to furnish the rudiments of a forester's education, it will aim, also, to furnish instruction in the highest practical branches of it.

"We ask for your co-operation in all that relates to the good of Pennsylvania forestry."

Mayor Samuel H. Ashbridge said that the people were only just commencing to understand the true value of forestry, and the leaders in this movement were worthy of the highest commendation. At the present time the best thoughts of some of our ablest men were being given to the subject of the preservation of the forests.

Thomas Martindale spoke of the means of preserving to hunters, and to the country generally, the live game which we now possess. Under present conditions the laws for the preservation of game are entirely too lax, and if not made more stringent, numerous species will soon be extinct. He instanced the need of a national law, and suggested that the Association should bring before the Federal Government a draft of one.

Dr. Bushrod W. James, President of the Pennsylvania Fish Protective Association, stated that through the efforts of their organization the shad fishery of Pennsylvania has been raised in five years from a total of $75,000 a year to $600,000. He also spoke of the need of a general law, because the rivers and streams very frequently ran through more than one State. An interesting piece of information was, that during the last year 105,000,000 small fish had been put into the streams and rivers of this State.

L. O. Armstrong was the last speaker. As a delegate of the North American Fish and Game Protective Association, he was glad of the formation of the International Forest, Fish and Game Association. Many of the fish, birds and big game are migratory, and it is necessary to protect them on both sides of the boundary line between the United States and Canada.

The convention closed with music, the drama of Hiawatha, various interesting water and athletic sports, a representation of a wild boar hunt, and a performance by the diving elks.

The value of scientific forestry is becoming recognized. The Baltimore and Ohio Railroad Company has asked the Bureau of Forestry of the U. S. Department of Agriculture for a working-plan for its tract of 125,000 acres in Nicholas and Pocahontas counties, West Virginia.

President Roosevelt says Our Forests Need Protection.

PRESIDENT ROOSEVELT, in his first Annual Message, makes a strong plea for forest reserves, and we hope that the policy outlined can be carried to completion. He says:

"Public opinion throughout the United States has moved steadily toward a just appreciation of the value of forests, whether planted or of natural growth. The great part played by them in the creation and maintenance of the national wealth is now more fully realized than ever before.

"Wise forest protection does not mean the withdrawal of forest resources, whether of wood, water or grass, from contributing their full share to the welfare of the people, but, on the contrary, gives the assurance of larger and more certain supplies. The fundamental idea of forestry is the perpetuation of forests by use. Forest protection is not an end of itself; it is a means to increase and sustain the resources of our country and the industries which depend upon them. The preservation of our forests is an imperative business necessity. We have come to see clearly that whatever destroys the forest, except to make way for agriculture, threatens our well-being.

"The practical usefulness of the national forest reserves to the mining, grazing, irrigation and other interests of the regions in which the reserves lie has led to a widespread demand by the people of the West for their protection and extension. The forest reserves will inevitably be of still greater use in the future than in the past. Additions should be made to them whenever practicable, and their usefulness should be increased by a thoroughly businesslike management.

"At present the protection of the forest reserves rests with the General Land Office, the mapping and description of their timber with the United States Geological Survey, and the preparation of plans for their conservative use with the Bureau of Forestry, which is also charged with the general advancement of practical forestry in the United States. These various functions should be united in the Bureau of Forestry, to which they properly belong. The present diffusion of responsibility is bad from every standpoint. It prevents that effective co-operation between the Government and the men who utilize the resources of the reserves, without which the interests of both must suffer. The scientific bureaus generally should be put under the Department of Agriculture. The President should have, by law, the power of transferring lands for use as forest reserves to the Department of Agriculture. He already has such power in the case of lands needed by the Departments of War and the Navy.

"The wise administration of the forest reserves will be not less helpful to the interests which depend on water than to those which depend on wood and grass. The water supply itself depends upon the forest. In the arid region it is water, not land, which measures production. The western half of the United States would sustain a population greater than that of our whole country today if the waters that now run to waste were saved and used for irrigation. The forest and water problems are, perhaps, the most vital internal questions of the United States.

"Certain of the forest reserves should also be made preserves for the wild forest creatures. All of the reserves should be better protected from fires. Many of them need special protection because of the great injury done by live stock, above all by sheep. The increase in deer, elk and other animals in the Yellowstone Park shows what may be expected when other mountain forests are properly protected by law and properly guarded. Some of these areas have been so denuded of surface vegetation by over-grazing that the ground-breeding birds, including grouse and quail, and many mammals, including deer, have been exterminated or driven away. At the same time the water-storing capacity of the surface has been decreased or destroyed, thus promoting floods in times of rain and diminishing the flow of streams between rains.

"In cases where natural conditions have been restored for a few years, vegetation has again carpeted the ground, birds and deer are coming back, and hundreds of persons, especially from the immediate neighborhood, come each summer to enjoy the privilege of camping. Some, at least, of the forest reserves should afford perpetual protection to the native fauna and flora, safe havens of refuge to our rapidly diminishing wild animals of the larger kinds, and free camping grounds for the ever-increasing numbers of men and women who have learned to find rest, health and recreation in the splendid forests and flower-clad meadows of our mountains. The forest reserves should be set apart forever for the use and benefit of our people as a whole, and not sacrificed to the short-sighted greed of a few.

"The forests are natural reservoirs. By restraining the streams in flood and replenishing them in drought they make possible the use of waters otherwise wasted. They prevent the soil from washing, and so protect the storage reservoirs from filling up with silt. Forest conservation is, therefore, an essential condition of water conservation."

The Yale School of Forestry at Milford, Pa.

THE Summer School of Forestry opened on July 8th, with twenty-one students, of whom seven were women, continuing in session until September 1st.

The men were accommodated in a camp on a cleared knoll in the forest, while the women resided at the hotels or boarding-houses. There was a wide range in the age and objects of the students of the school. Some were young collegians who were taking up forestry as a profession; others desired to become forest rangers, or to obtain a better knowledge of forest management or forest botany. Some were owners of forest lands who wished to obtain additional information, while still others were teachers.

The lectures included courses on Forest Botany, Silviculture, Forest Measurements, Introduction to Forestry, and Forest Protection, etc. There were also practical lessons in forest thinning, forest measurement, and forest botany, the use of various foresters' and lumbermen's instruments, etc., the whole being presided over by Profs. Graves and Toumey.

New Publications.

Notes on the Red Cedar. By Charles Mohr. 8vo., 38 pages, illustrated. U. S. Department of Agriculture, Washington, D. C.

This excellent report was prepared by the late Dr. Mohr, and gives the geographical distribution of the red cedar in the United States and Canada, that of the former being graphically shown on a map. Detailed descriptions are given of the wood, the growth and development of the tree, as well as its various enemies, together with an interesting botanical description and morphology. It is intended to supplement this paper hereafter by the results of a more detailed study of the red cedar in the field.

Practical Forestry in the Southern Appalachians. By Overton W. Price. 8vo., 16 pages, illustrated. Department of Agriculture, Washington, D. C.

This paper is a reprint from the Year Book of the Department for 1900. Mr. Price describes the mountainous country of Western North Carolina and Eastern Tennessee, as well as of the forest covering it, the systems of lumbering employed, forest fires and their causes, suggestions for management, etc.

Third Annual Report of the New York State College of Forestry. 8vo., 56 pages. Albany, N. Y.

In his report as Director for the year 1900, Dr. B. E. Fernow states the progress made has been satisfactory. The number of students now on the roll is 25, and, in addition, 29 persons are taking special courses. Operations in the college forest were hindered by lack of sufficient capital, rendering it necessary to concentrate logging operations at one locality, work being started in July. Cordwood is cut by contract, but the felling of trees was done by the College, in order to spare the young growing trees from injury. Tables are given showing the composition of a culled Adirondack forest, the proportion by classes of hardwood trees over twelve inches in diameter, the results of felling, material furnished by trees of different diameter, the areas planted, and the cost of same. Planting young trees, including the purchase of plants and labor, cost $9.90 per thousand the first year, while in the second year, when smaller and cheaper kinds of trees were used, the outlay was reduced to $4.85 per thousand, which it is hoped will be still further reduced when the nurseries are in operation. Two nurseries have been established, and the work to be done is outlined, the report closing with the financial statement. A map is appended showing the Cornell College Forest in Wawbeek district, New York.

Report of Second Annual Meeting of the Canadian Forestry Association. The report is an attractive, illustrated pamphlet of 64 pages, containing the proceedings of a meeting held at Ottawa, March 7, 1901. The report of the Board of Directors is a concise statement of the work done by the Association during the past year, and calls attention to the needs of the future. The papers and discussions which follow are extremely interesting, not because they set forth theories suitable only to ideal conditions, but because they deal with facts and methods that are logical conclusions from the consideration of these facts.

"Forestry on Dominion Lands," setting forth the work of the Forestry Branch of the Department of the Interior in regard to fires, timber reserves, and tree-planting on the plains, "The Economic Management of Pine Forests," "The Pulp Industry in Relation to Our Forests," were some of the subjects on which papers were read. A lecture on "The Commercial Side of Governmental and Private Property," by C. A. Schenck, Ph.D., is also contained in the report.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIAL.

THE close of the year 1901 was signalized in Eastern Pennsylvania by unusual rainfalls, causing heavy freshets, with considerable resulting damage. A decided fall in temperature closely following the rainfall checked the flow of the minor streams, thus mitigating the effects of the freshet; but serious injury resulted in the anthracite coal region, where general forest denudation from the steep mountain sides encouraged rapid run off. It is not claimed that freshets will be prevented by the maintenance of forests, but the existence of wooded areas protecting the absorbent forest floor, and checking the melting of snows, admittedly mitigate the rapidity of run off in times of heavy rainfall.

We have had opportunity within the past year to watch closely the discharge of contiguous streams draining nearly equal areas, with different percentages of these covered with forests, and the evidence of the protecting influence due to the presence of wooded tracts is conclusive.

When we realize that one inch of rain on one square mile represents a volume of nearly two and one-third million cubic feet, or nearly seventeen and a half million gallons, and that this volume represents a weight of sixty-five thousand tons, we are not surprised at the damage done by streams draining hundreds of square miles on which three inches of rain may fall in a day. But millions of cubic feet, gallons, or tons, scarcely appeal to us as forcibly as the fact that the volume of water represented by one inch of rain on one square mile would fill a pipe sixteen miles long whose diameter would permit a man to stand upright in the pipe; or, the same volume would fill 350,000 ordinary coal-oil barrels, or fill a reservoir 500 feet square to a depth of nearly ten feet. Multiplying these figures by liberal drainage areas and greater depositions of rain, we can understand the volume of swollen streams.

The damage done by the rapid run off from steep denuded areas has its sequel in restricted flow after the rain has ceased, and this is especially notable when drought follows seasons of unusual rain deposition.

Every freshet and every drought emphasizes the importance of the State of Pennsylvania maintaining a system of forest protection on the one-sixth of its area which the Commissioner of Forestry asserts is better adapted to forest growth than other purposes, and is a strong argument in favor of increasing and maintaining its forest reserves.

J. B.

Large Chestnut Groves in Union County, Pa.

COLEMAN K. SOBER, of Union County, is said to be the owner of the largest chestnut groves in the United States. They comprise 205 acres of land, on which there are growing over 100,000 chestnut trees. Mr. Sober's object has been to solve the problem of rendering productive and profitable the wild mountain land in Pennsylvania.

Mr. Sober is a lumberman whose attention was first attracted to the culture of chestnuts when a lad of twelve. Five years ago the boy, now a man past fifty, put into execution his early ideal, and it is a demonstrable proposition that the chestnut orchard within the next few years will yield a good income.

The trees are all growing upon what would otherwise be waste mountain land—soil that could not be profitably utilized. It is such land as is found in every county of the State where lumbering operations have denuded the soil, and left it a wilderness of underbrush and tangled vine. This fall Mr. Sober harvested thirty bushels of Paragon chestnuts, and distributed the crop among his friends.

The chestnut groves are located on the mountain sides that enclose Irish Valley, six miles from Paxinos Station, and about eight miles from Shamokin. It is a beautiful depression, walled in to the east and west by parallel spurs of the Alleghanies. The sides of the latter are sloping and rocky, originally covered with oak, sap pine and chestnut timber. The pine and oak were cut down a generation ago, leaving the chestnut standing in places. Some of the latter was marketed, and there has since grown up a second growth of this timber.

The method pursued in beginning this chestnut grove experiment was to cut down the standing trees on the land in the fall. The following spring young shoots would appear around the stumps of the fallen trees, which were grafted with scions of the Paragon nut. This Paragon nut is about five times the size of the average American chestnut. It is crisp and sweet, and differs from the Italian chestnut, which is coarse and tasteless, or else has an acorn flavor, which is decidedly unpleasant. The first scions used in grafting the Sober trees were obtained from W. H. Engle, Marietta, Pa.

Mr. Engle originally conceived the idea of raising chestnuts for the market, but his grove in Lancaster County, comprising about thirty-five acres, was destroyed by fire. The owner died, and the grove was not restored.

Two of the grafted Paragon chestnut trees standing near the gateway of the Engle home are said to have given seven bushels of chestnuts each, last year.

Ninety per cent. of the trees in Mr. Sober's groves were grafted during the first year. The Paragon scions were cut in February, laid away in sand, and the grafting process begun in early spring. Ninety per cent. of the grafts were successful.

The "cleft" or wedge graft, which was originally used, has been entirely superseded by the "tongue" or whip graft. This graft is held in place by a wax, the formula of which is as follows: To two pounds of rosin there are added one pound of beeswax and one-half pound of beef tallow. This is melted together, worked like taffy, and will stand any weather.

The principal chestnut grove stretches along the mountain side for nearly a mile on the right-hand side of the road. It consists of 125 acres. An eighty-acre grove crowns the hillside to the left. The roads leading to the chestnut groves are bordered with cherry trees, forty feet apart. Between the farmhouse and the mountain are orchards of peach, pear, apple, cherry and other fruits, embracing over sixty acres.

The chestnut trees begin bearing in a small way the second year. The third year the burrs increase in number, and as high as three pints of chestnuts have been gathered from a three-year-old tree not more than six feet high. The four and five-year-old trees bear from two quarts to half a peck, and as the tree grows the yield increases proportionately.

There are to-day on the farm 100,000 trees, which will bear from one pint upward of chestnuts next fall. If a general average of one quart per tree be estimated for the yield of the groves, the product, in round numbers, will be 3125 bushels of chestnuts. At the rate of $6 per bushel, an income of $18,750 is assured. Allowing $3750 for the expenses of protecting and gathering the crop, the net profit to Mr. Sober will be $15,000. And this from land which, for agricultural purposes, would not bring $3 per acre. As the grove increases in size and age, there must be a weeding out. But while the number of trees will be reduced, the productiveness of the grove will not be lessened.

Mr. Sober's idea for the reclaiming of waste land is the transplanting of young chestnut seedlings, the establishment of a grove from planting the nut being regarded as a process entirely too slow. There are millions of young chestnut seedlings on otherwise waste land on which can be grafted the Paragon scion, with no expense beyond the cost of grafting and protection against the enemies of the chestnut. These enemies, in the order of their danger, are the weevil and thieves.

The groves are protected against fire on two sides by fire roads—wide avenues denuded of timber and then burned over. In the fall all the brush gathered in the grove is heaped in piles and permitted to lie until midwinter, when the ground is covered with snow. Then on a rainy day the brush piles are saturated with kerosene oil, large hinged frames of pine boards covered with asbestos are set up to protect the trees in the vicinity, and the brush-piles are fired.

The men on the place are fully instructed as to their duties in case of fire.

Next to the fire, the chestnut weevil, whose product is the fat, white grub familiar to chestnut eaters, is the most destructive enemy of the nut. It is a beetle about half an inch long, with sharp mandibles, which enable it to bore through the burr and into the nut, and there deposit its egg. The grub finds its way into the ground after the nut falls, where it remains until spring, to come forth as a winged insect and propagate its kind in like manner.

The ordinary game chicken is found to be the greatest enemy of the chestnut weevil. A brood of one hundred game chickens in a grove of twenty-five acres will in the course of a few years reduce the multitude of chestnut weevils to a minimum. Sheep turned to pasture in a chestnut grove with the chickens assist in keeping the grass and undergrowth cropped close, thus aiding the fowls in their scavenger work. Experiments on the farm demonstrate that of all chickens, the ordinary American game chicken is the greatest destroyer of grubs, worms and insects.

Insect traps are set in the garden and fields. They consist of a circular sheet-iron disc or pan three inches deep, filled with water, and with a light covering of coal oil. In the centre is placed a small lamp, and extending from the surface of the oil to the height of eight inches are four tin arms, set like a wheel.

The insects destructive to fruits and vegetables travel by night in swarms. When attracted by a light, as in the case of a moth, they begin circling around the flame. As the circle narrows they invariably strike one of the projecting arms, and drop into the pool of oil and water below. Bushels of insects are caught in this way, scooped out and burned the following morning. It is proposed to utilize this device in the chestnut groves next year.

While the chestnut thief is the enemy least to be dreaded, his depredations in a grove amount to hundreds of bushels every season. As a rule, like other thieves, he works at night. Two watch houses have been erected in the grove, where an armed man, accompanied by a dog, stands guard night and day, and at intervals patrols the grove. Next fall a watch tower will be erected on the top of the barn, in which will be placed an acetylene search-light, whose rays will sweep the country for a distance of a mile and a half.

The best soil for chestnuts is a shady, protected mountain side. A limestone soil is not suitable. After a seedling has been transplanted it should be cut off three feet from the ground and grafted. It is best, in grafting, to cut back and leave only three or four eyes to form a head. In a great majority of cases these grafts will, the first year after, develop a fan-shaped head. These must be cut back so they will head out successfully.

The experiment of Mr. Sober is attracting the attention of arboriculturists. It opens a wide door in the matter of reclaiming waste lands and as a source of profit to those who undertake the work.—*The Press*.

A report has been issued on the "Proposed Municipal Improvements for Harrisburg, Pa.," dealing with the filtration problem, sewage, paving, and a park system. It is the latter which will be most interesting to our readers. A comprehensive system of parks has been planned out by Mr. Warren H. Manning, including the adornment of the river front, playgrounds, and small city parks, pleasure roads, and a large country park, making a total of 950 acres, at a cost of slightly over half a million dollars. The question of a municipal loan to defray the cost of this and other improvements will come up at the February election, and we hope the proposed park system (at least in part, if not as a whole) may soon be a completed fact.

Another Enforcement of Forest Fire Laws.

IN the month of October, 1901, a considerable portion of the mountains in Franklin County were burned over. These fires were started at different places for miles along the foot or front of the mountains. It was evident that there was a gang of rascals engaged in this attempt to destroy as much of the growing timber on the mountains as possible. These miscreants are hard to detect; but there being some evidence against Jos. Mentzer, of Tomstown, he was arrested, and when the case was tried at December Term, 1901, the evidence presented against him was so convincing that the jury very promptly returned a verdict of guilty. It was proved at the trial that Mentzer was seen setting fire to the mountains at three different places, about one-half mile apart. He seemed to think he had license to set fire to the mountains just as he pleased. But Judge Stewart, in sentencing, gave him to understand that such crime would not be tolerated. The defendant was sentenced to pay a fine of five dollars and costs, and to undergo imprisonment in the county jail for a period of ten months. The local authorities are very grateful to Robert S. Conklin, the efficient clerk to the Commissioner of Forestry, for his assistance in bringing Mentzer to justice.

The Appalachian National Park.

ATTENTION has been called a number of times, in these columns, to the proposed reserve in the southern Appalachian mountains, which is advocated by the Appalachian National Park Association and endorsed by numerous organizations.

In furtherance of this Appalachian National Park movement, the following preamble and resolutions were unanimously passed by the Pennsylvania Forestry Association:

Whereas, The Appalachian National Park Association is forwarding the movement to secure national forest reserves of not to exceed 2,000,000 acres in the Appalachian mountains in the States of North Carolina, Tennessee, Virginia, South Carolina, Georgia and Alabama, therefore be it

Resolved, That the Pennsylvania Forestry Association heartily endorses this endeavor to preserve the forests on the highest and largest mountain masses east of the Mississippi River, which contain the headwaters of most of the streams of the southeastern States.

Resolved, That a copy of these resolutions be forwarded to the representatives in Congress from Pennsylvania, with the request that they use their influence to secure such National Appalachian reserves.

Senator Pritchard, of North Carolina, who has had this movement in hand since its inception, introduced a bill in the Senate on December 17th, appropriating $5,000,000 for the purchase of 2,000,000 acres, to be known as the Southern Appalachian Forest Reserve, a similar bill being introduced in the House of Representatives by Representative Moody, of North Carolina. These bills are similar to that mentioned in FOREST LEAVES as introduced at the previous session of Congress.

Mr. Brownlow has also introduced in the House of Representatives at Washington a bill for the purchase of a national forest reserve in the Southern Appalachian Mountains, to be known as the McKinley National Park and Forest Reserve, in the States of West Virginia, Virginia, North Carolina, South Carolina, Georgia, Alabama and Tennessee, not to exceed 4,000,000 acres, for which the sum of $10,000,000, or as much thereof as is necessary, is to be appropriated. The Secretary of Agriculture is to make rules and regulations for the care, protection and use of said reserve, and for the sale at public auction of such wood as may be removed without injury.

It will be noted that Mr. Brownlow's bill increases the proposed reserves from 2,000,000 acres, as proposed by the Appalachian Park Association, to 4,000,000, and gives another name to the reserve. We hope that the fact that there are two different bills will not delay the early establishment of a forest reserve in the Appalachian Mountains, particularly as President Roosevelt, in a special message to Congress, has presented the reasons for such a reserve, and asked for favorable consideration of it.

Annual Meeting of the American Forestry Association.

THE twentieth annual meeting of the American Forestry Association was held at Washington, D. C., on December 11th, President James Wilson occupying the chair at the opening of the session, Vice-President B. E. Fernow during the remainder.

In opening the meeting, the Hon. James Wilson called attention to the great strides forestry has made during the year.

Mr. Gifford Pinchot then read the report of the Board of Directors, calling attention to the great activity witnessed during the past year in local, State and federal circles. Two new national forestry reserves were declared during 1901 by President McKinley,—the Wichita reserve of 57,120 acres in Oklahoma, and the Payson reserve of 86,400 acres in Utah. There was also an addition of 142,080 acres to the Cascade reserve in Oregon. Mention was made of the advance of the Division of Forestry to a Bureau, as has been already stated in FOREST LEAVES. The status of the forestry movement in some of the States is recorded, together with a list of new forestry associations formed. The statement is made that there are now twenty-two national and State forestry associations in the United States. Announcement was made that hereafter the *Forester* would consolidate with *National Irrigation* as *Forestry and Irrigation*, becoming the joint official publication of the American Forestry Association and the National Irrigation Association. Attention was also directed to the proposed National Appalachian Reserve, the forestry work in the Philippine Islands, in Nebraska and in the South, etc.

A Committee on Resolutions was appointed who presented a report recommending that all branches of the Federal Government now in charge of work relating to public timber lands and forest administration be united in the Bureau of Forestry. Approving the proposed National Appalachian Reserve, and favoring the setting aside of 500,000 acres of land in the sand hills of Nebraska to be devoted to forest purposes. All of these resolutions were adopted.

The report of the treasurer was read and accepted.

The following officers were elected: President, Hon. James Wilson; First Vice-President, Dr. B. E. Fernow; Corresponding Secretary, F. H. Newell; Recording Secretary, George P. Whittlesey; Treasurer, Otto J. J. Luebkert; Directors, James Wilson, B. E. Fernow, Henry S. Graves, Henry Gannett, Edward A. Bowers, Arnold Hague, Thomas Walsh, Gifford Pinchot, Frederick V. Colville, F. H. Newell and George P. Whittlesey. With the exception of a few changes, all of the vice-presidents in the different States and Territories were re-elected.

In the evening a large number of the members were entertained at the home of Mr. Pinchot.

No doubt the omission to give credit to FOREST LEAVES for the illustration of the Red Cedar, published in "Notes on the Red Cedar" (Bulletin 31, Division of Forestry, Department of Agriculture, Washington), was due to the death of the lamented author, Dr. Charles Mohr, who was always most careful to recognize any help. See FOREST LEAVES, vol. ii., No. 10, page 148.

Iowa Park and Forestry Association.

THE Iowa Park and Forestry Association, which was organized at Ames in November, held a meeting at Des Moines, Iowa, on December 10, 1901.

Mr. C. A. Mosier, of Des Moines, presented a paper on the objects and aims of the Association, which he stated were as follows: To present to the people and Legislature the necessity of establishing one or more State parks, embracing within their boundaries large bodies of water and groves of native timber, whereby such parks would be greatly enhanced in beauty of scenery, as well as made more comfortable and enjoyable for the people; to encourage the making of more parks in and about the chief cities; to awaken increased interest in forestry and protection of our native timber; and to urge legislation necessary to accomplish these objects. He said that but one-eighteenth, or 2,000,000 acres, of the State of Iowa was in timber land, and to supply home consumption alone the State should have one-fourth, or 9,000,000 acres.

Dr. L. H. Pammel, of Ames, gave an illustrated address on the attitude of the Federal Government towards forestry problems. He said that of the 623,000,000 acres of farm land in this country, 200,000,000 acres are in woodland, and that the total for the United States was 700,000,000 acres, or 1,100,000 square miles.

Mr. J. T. D. Fulmer, of Des Moines, read a paper entitled "Forest Trees for Park Purposes," mentioning various varieties and the arguments for each.

Mr. Elmer Reeves detailed the history of his father's trees, planted in 1869. It was agreed that the good land of Iowa was too valuable for tree growing, but the poor land ought to be used for this purpose, and some of it is to-day profitably so used.

Mr. Klehm, of Arlington Heights, Ill., presented the ideal home grounds, group planting, etc., while Prof. N. B. Hansen talked on European Parks, and A. T. Erwin read a paper on "Desirable Shrubs for Iowa Parks."

A bill was prepared for presentation to the State Legislature to create the office of State Park Commissioner, making the Secretary of the Department of Horticulture, *ex-officio*, incumbent of the office. This Commissioner is to have general supervision over the proposed parks, forests and orchard reservations in the State of Iowa. Provision is also made that persons may set aside tracts of land for forest or orchard reservations and receive concessions in the amount of taxation.

Resolutions were also passed endorsing a great

national forest reserve at the headwaters of the Mississippi River, and for other national forest reserves

Dr. Thomas H. McBride is President of the Association ; Wesley Greene, Vice-President ; Dr. L. H. Pammel, Secretary ; Silas Wilson, Treasurer ; George H. Van Houten, C. A. Mosier and Prof. H. C. Price, members of the Executive Board.

Pennsylvania's Hemlock Forests.

PENNSYLVANIA, "The Sylvania" of William Penn, sends to Maine for Christmas trees, and is to-day buying much of the lumber used in her diversified industries from the West and South. Within the past five years the price of Pennsylvania hemlock has nearly or quite doubled, and an authority in the trade has recently said that the price of Pennsylvania hemlock would shortly be quoted at $20 a thousand feet, because what remains of the diminished supply is in such few and strong hands that there is bound to be a decided restriction in production. This same authority says that the United States Leather Company owns or controls perhaps 70 per cent. of the hemlock stumpage of the State, while the other larger owners are holding back, fearing the total consumption of the forests.

The United States Leather Company is holding on so as to continue its supply of bark for another decade, and not to conserve the lumber supply. But never before was there greater activity in lumbering, for wherever there is standing timber there may be seen the smoke pouring forth from the stack of a sawmill, and can be heard the hungry whirr of the busy buzzing saw. The price of "stumpage" and timber land has been advancing by leaps and bounds with the past two or three years, until it is so high that the temptation has become almost irresistible, and many tracts held inviolate for years have been invaded by the ringing axe of the wood-chopper.

Many tracts have been lumbered for a second and even a third time, these apparently waste lands yielding a few hundred thousand feet of inferior lumber, after having been denuded of their pine, hemlock and hardwoods by former operations. From these are now taken the second growth and less valuable woods. Nothing is too small to be used ; when it cannot be cut into anything larger, it will make bed slats, laths, and even match blocks.

The "tieman" follows in the wake of the lumberman, and takes what is left of the chestnut and smaller oak. But even the tie-timber is getting scarce, and the supply is becoming so uncertain in quantity and quality that the great trunk lines are no longer depending on a home supply, but are shipping them in great quantities from the Virginias and the South. After the tieman come the "prop-timberman," who finds the scrawny "jackpine." This tree is practically useless to the lumberman, but it is valuable for mine props, and large quantities of it are being shipped to the anthracite coal regions.

Formerly, vast quantities of good wood went to the burner in the form of slabs and edgings ; but to-day there is practically too much waste of this character. The offal is worked up into lath and kindling wood, and finds a ready market at a considerable profit.

At the present rate of destruction five years more would likely see the end of the great lumber industry in the Keystone State on a scale of any magnitude, but the holdings of the United States Leather Company will prevent, or at least postpone, this dire calamity for nearly a score of years, by which time the good work now being accomplished by the Department of Forestry will, no doubt, begin to bear fruit, and save what would otherwise be a hopeless situation.

Williamsport has lost its distinctive character as a great lumber mart, and will soon cease to be known as the "Lumber City," a renown that it has enjoyed for more than a generation. The great Susquehanna Boom, whose piers dot the river for miles above the city, was first built in the early 50s, and greatly enlarged and extended about 1865, when began in earnest the cutting down of the great forests of pine and hemlock that covered the watershed of the West Branch, and which made Williamsport one of the greatest lumber marts of the world—with an annual cut of nearly 300,000,000 feet of the finest white pine.

Prior to 1880 the vast areas of hemlock on the waters tributary to the West Branch escaped the axe of the woodsman, being esteemed of little value by the lumbermen who were busily engaged in reaping the harvest afforded by the pine which clothed thousands of acres of hill and dale over the whole West Branch watershed. These pine lands, it has since been demonstrated, were in nearly every instance underlaid with great beds of bituminous coal, but in the heyday of the pine the wealth above ground was far more important than what might be hidden underneath. The hemlock was sandwiched in between these pine "barrens" on less favored soil.

The white pine of the West Branch had a wide reputation for the excellency of its texture, freedom from knots, and the great size of the trees from which it was sawed. But the mammoth pines

that grew on the "barrens" between the forks of Pine Creek, in Pine Township, Lycoming County, was second to none the world over in the beauty and value of the soft, white wood.

The great hemlock forest was an object close to the heart of the tannery man, and by the early 70s the hemlock belt of Central Pennsylvania was dotted with the big sole leather tanneries, around which struggling and untidy little hamlets soon grew up. Of such little value was the bark to the land owner that the astute tannery men obtained leases on thousands and thousands of acres of hemlock lands for the mere cutting and peeling of the timber. Thousands of acres were stripped of their bark by the tanneries, and the timber allowed to rot where it fell.

But all this has changed. The once seemingly inexhaustible supply of pine is now but a memory, and the end of the once despised hemlock is almost upon us, and where once the forest primeval reared its tufted heads is now a blackened waste, the playground of the waters that carry destruction in their wake in oft-recurring floods.

Upon the organization of the United States Leather Company, a few years ago, it was found necessary for the company to obtain as much of the remaining hemlock lands as possible if the supply of bark for its tanneries was to be conserved, and it pursued a policy of extended purchasing, always on a rising market, and to-day it controls much of what remains of the hemlock stumpage. Hemlock bark has been steadily increasing in value, and is to-day worth about $7.50 a long ton.—*The Press.*

Molave (Vitex littoralis, Dcne).

THE Philippine Islands are rich in the varieties of tree species, one of the most important of which is known by the natives as Molave (Vitex littoralis, Dcne), having several other synonyms. It belongs to what is known as the Superior Group, and is found in the Islands of Cebu, Leyte, Luzon, Masbate, Mindanao, Mindoro, Negros, Panay, Paragua, Samar and Sorsogon.

Father J. J. Delgado, in describing this wood in the year 1733, gives it first place for its great use and adaptability, naming it the "Queen of Woods," not only for the above, but also for its durability and resistance to decay, whether it was under cover, exposed to the action of the weather or under water. It is easily sawed and worked, especially when recently cut. There is scarcely a house in the Islands in the building of which Molave is not used for posts called "harigues." They are buried three feet deep in the earth, and, even if this is damp, will not easily rot. The wood was also much used in the manufacture of galleons for the old Spanish navy, and it was claimed that statues made from it were very durable.

Padre Blanco states that the "Leaves are compound, with three to five leaflets on common petiole ; leaflets lance-shaped, somewhat hairy on the margin and the midrib. Petiole short, with a knot near its middle, from which it doubles a little the other way. Flowers (blue in color) verticillate in panicles. Calyx very small, erect, bell-shaped, with three or four teeth. Corolla with two lips, bell-shaped, the tube curved and dilated above, the upper lip emerginate ; the lower lip three-parted, the middle part the largest ; the throat and palate wooly ; stamens grouped two by two, hairy on lower part ; anthers of figure of half moon; style of same length as stamens ; stigma bifid ; drupe small, globular, with one nut, as in other species.

"The tree attains a height of more than fifty feet, and is very often crooked. It is somewhat of a straw color, and when worked smells like honey. It is very hard and brittle, and can thus be easily sawed and worked, but sometimes contains holes and knots, making it more difficult to work."

"The Molave is much sought after, and grows everywhere. The fine sawdust has been used with happy effect in wounds, being applied to the blood and left there until it falls off. An infusion of the wood produces a pretty straw color, but it is not lasting."

Salvador Ceron states that it grows to a height of more than twenty meters. The texture of the wood is very compact and fine, the pores small, in some pieces scarcely perceptible ; the fibers generally very compressed. It has a somewhat acrid odor, a slightly bitter taste, breaks in short splinters, while the shaving is fine, compact, flexible and curved.

Foreman says that logs can be obtained 35 feet long and 25 inches square, the wood resisting sea worms, white ants, and the action of the climate, and is especially valuable for work either above or below ground, and all purposes where an extra strong and durable wood is required.

D. Vidal states that the identity of the wood can be established by a simple experiment, viz., that when the wood is treated with lime it exudes a yellow resin, which soon hardens, and the same results obtain even when the wood has been cut many years.

S. Vidal gives the following as the average of a number of tests of its physical properties : Elasticity, 0.0035 meters ; the point of greatest resistance is to a weight of 41.552 kilogrammes ; weight in open air, 10.499 grammes ; specific gravity, 0.819.

Crab Apple (Pyrus Coronaria, L.).

FEW, if any, of our native trees are more suggestively named! The twisted, ragged aspect of the tree at a distance is only increased by nearer approach, when its sharp or "rugged spurs" notify one to attempt no familiarities. Its one redeeming feature is the blossom.

In Pennsylvania its maximum height is about twenty-five feet, with a diameter of about one foot. On the old specimens the bark is rough, though the flakes are small, owing to numerous fractures. These usually turn up more or less on the edges, and it is to this, mainly, that the roughness is due.

The crab apple here is generally found on high, poor soil, and no tree can be expected to show a thrifty growth there. The branches would naturally suggest a starving process, which the tree had lived through in spite of; but, unfortunately, it improves but little in appearance even when its lot has been cast in lower, fertile soil.

Clearly enough, the short spurs which render approach to the limbs somewhat difficult are themselves but modified branches.

The broadly ovate leaves have blunt teeth, or are slightly lobed, sometimes. They are from two to three inches long, hairy when young, and on downy footstalks, which are from three-fourths of an inch to an inch and a quarter long.

The exceedingly fragrant pale "rose red" or whitish flowers are in clusters of from four to nine on the end of the branch spurs, and are about an inch in diameter. They appear in May. The fruit is intensely sour, somewhat bitter, and astringent as well. This was once used for making preserves. There is a peculiar, faint but pleasant odor to the mature fruit, which is imparted to the contents of bureau drawers when it (the fruit) is placed in them.

The crab apple tree has a rather wide range, from Ontario south to Mississippi, and from Minnesota south to the Indian Territory. In Pennsylvania it appears to be most common in our northeastern counties.

The wood is brown, or somewhat red, in color, heavy, and of a close texture, but neither very hard nor very strong. It is but slightly used in the arts.

The physical properties of the wood are: Specific gravity, 0.7048; percentage of ash, 0.52; relative approximate fuel value, 0.7011; weight, in pounds, of a cubic foot of dry wood, 43.92; relative strength, 282. It will be noted here that the strength of this wood is not in proportion to its specific gravity.

J. T. ROTHROCK.

Forestry a Practical Science.

FORESTRY is an extremely practical science, though perhaps hardly as much of a science in this country as in Europe, where conditions are more permanent and clearly defined. In the United States, forestry will for many years be largely experimental; the well-founded facts and methods taught by it must be applied to widely differing conditions, and its students will have to solve problems which are not found at the present time in the old world. Its principles must be applied to private timbered estates rather than to public forests for the most part, inasmuch as the timber lands held by private parties so vastly outweigh in area and in quality those in possession of the National or State governments. Yet the principles to be applied in all these multitudinous ways are at the bottom the same.

The most important work that the American forester has to do is to determine how, with profit to the individual owner, the virgin forests may be changed from the wasteful care of nature to the economic treatment of science. This expression "with profit" is an important one in this connection, for the profitable utilization of this property is what the individual timber owner, except in a few rare instances, wants to and must accomplish.

In Europe, for the most part, forestry is conducted along lines which, though subject to development, have been well defined for generations. There is much that may be learned from the old countries—timber growing and timber preservation may be studied there; but the practical conditions from the commercial standpoint are so different in this country that the European forester has much to learn when he approaches the subject on this side of the water. It is for this reason, largely, that forestry has until a comparatively recent time been so impracticable when applied to American conditions.

But within the last few years there has been a decided change in this respect. There has been an awakening on the part of students of European forestry to the fact that conditions in this country are decidedly different, and some European foresters have brought their training in the old world schools and methods to the United States with the perception and intelligence necessary to adapt them to new conditions. In addition, there has grown up a class of American forestry students who are characterized by the commercial insight which is necessary if forestry is to take its proper place in the economics of this country.

Forestry schools in the United States recently established are based upon practice. There are

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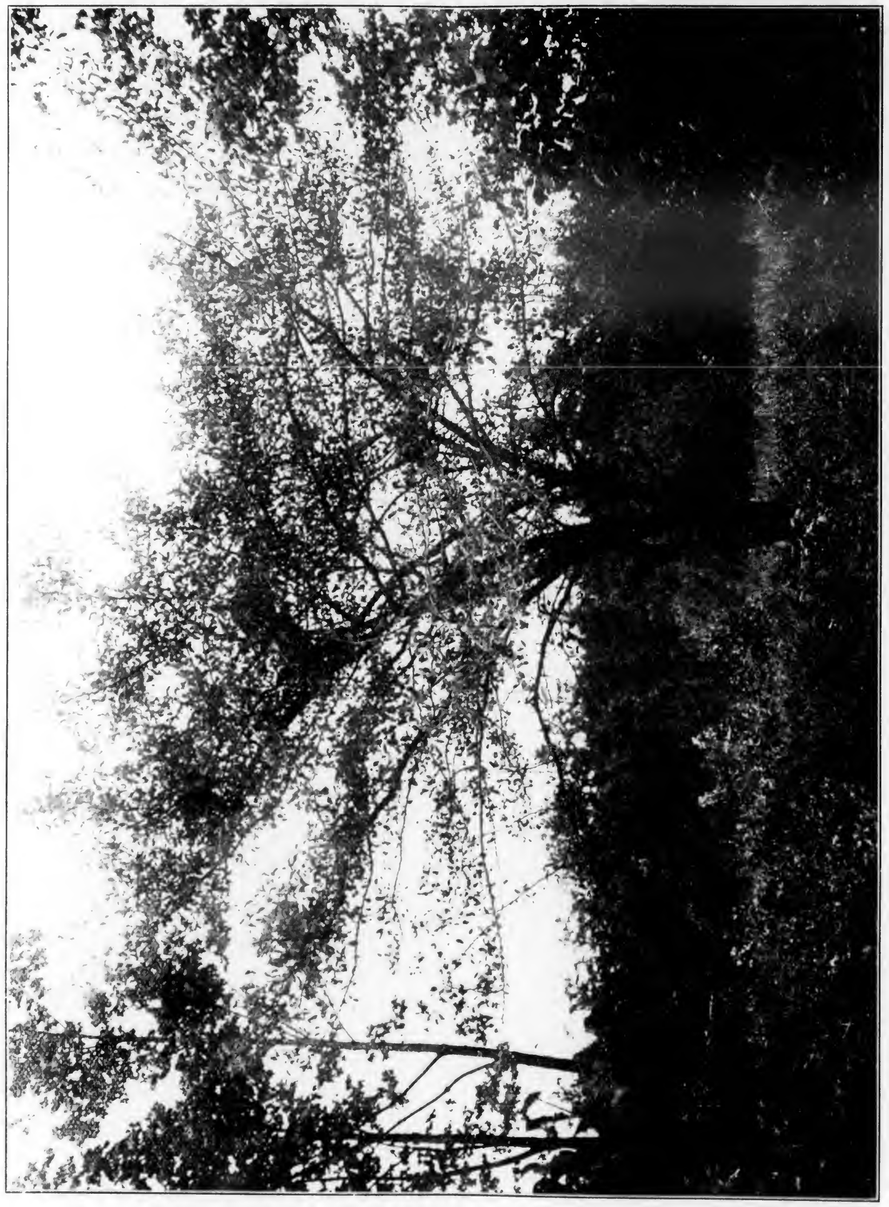

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INTENTIONAL SECOND EXPOSURE

forest reserves in New York, Pennsylvania, and perhaps elsewhere, where theories and experience can be demonstrated in practical results. The awakened public interest in forestry matters, therefore, will be saved from foolish vagaries and directed along useful lines; and among the ranks of foresters themselves the dreamer and dilettante will give place to the practical man of affairs.—*American Lumberman.*

Forestry at the Northeast Manual Training School, Philadelphia, Pa.

SO far as we know, the Northeast Manual Training School, Philadelphia, is the only public high school in the State offering to its pupils a course in economic forestry.

This course is now in its fourth year, and has proved so successful that a number of the boys contemplate taking up forestry as a profession.

To show the scope of the work, the following is taken from the Catalogue for 1902:

"Each student in the freshman class is taught to recognize at sight twenty or twenty-five of the common lumber-producing forest trees; the points of special study being the leaves, the bark, the trunk, the shape and arrangement of the limbs, and the general appearance of the tree as a whole.

"The timber of the tree is studied. Its strength, its elasticity, its loss in weight by seasoning and its use and value as a commercial product are discussed.

"Specially designed machines which have been constructed for testing the density and strength of woods are a part of the equipment of the manual department.

"Each student keeps a record of his experiments, using the average results of these as a constant in computing the strength of beams of different woods. Upon charts prepared for the purpose he notes the deflection under different loads and the ultimate breaking load."

Poplar trees have been marked for slaughter in Portland, Or. The city has many of this kind of tree, which were planted when the city was growing, and when shade trees of any other variety, except maples, were scarce. The objection to the tree is its trespassing on the sewers. It is a fast growing tree, and graceful when growing, but it reaches far with its roots, especially to find water, and the slender rootlets penetrate the smallest crack in the terra cotta sewers, forming masses of slender roots inside, and eventually choking the sewer.

Trees for City Sidewalks.

AS a result of comment on the condition of the trees planted on Broad Street, several correspondents have expressed a desire for some advice concerning the best species of trees for city street planting. The answer is not an easy one, because very much depends on the object to be attained. Where there is a long solid block of houses newly erected, cooling shade is generally desired quickly, because the building operator looks only for immediate results. What may occur fifteen or twenty years hence is of little concern to him. A rapidly growing tree, and one easy to manage, is what he requires. To this end the ordinary Carolina poplar or the silver maple meets the requirements exactly. But the owner of a property who expects to use it as a permanent home would not be justified in selecting either of these trees, because in a few years they become too large, and the tree butcher, with a saw and axe, is likely to be called in, and he is only the precursor of the final decay of the trunk and branches within a short time.

The genuine tree lover wants something more satisfactory and enduring. He is willing to have the shade come more gradually, providing he can have a beautiful tree at the same time. This is where the difficulty of selection comes in, for, while the rapidly growing species cited thrive in almost any soil or situation, the rarer trees are apt to have likes and dislikes in this particular. Further, some which might do well have not been well tested, others which will thrive have peculiarities which detract somewhat from their value. For example, the gingko, or maiden-hair tree, has a remarkable power of flourishing in spite of noxious gases prevalent in cities, and which are so detrimental to Norway and sugar maples; but it has most too much of an erect habit for shade-giving habits.

Nurserymen of experience declare that in a combination of good characters, that is to say, comparatively rapid growth, an umbrageous head and freedom from disease and the attacks of insects, the various species of oak promise to be among the best selections for city streets. Like the gingko, the oaks do not seem to suffer much from gases, and this is particularly true of the pin oak. Of other trees of comparatively rapid growth, the white ash is showing a similar adaptation. Unlike the Carolina poplar and the silver maple, they grow in beauty from year to year instead of becoming painful objects to the eye. The catalpa has been much praised of late; but aside from its winter disfigurement on account of its dry bean pods, a worm has recently shown a particular

fondness for the leaves, and thus it can hardly be considered further.

With many, a successful tree is the horse chestnut. It is sometimes regarded as of slow growth; but this depends in a great measure on the character of the soil in which it is planted. In rich earth, if of considerable depth to accommodate the tap root, the tree will often make an annual growth of from 18 to 20 inches, which is not far behind trees classed as rapid growing. The horse chestnut never requires beheading, and has a natural tendency to spread without becoming too tall. The chief objection to the tree is that its leaves mature as early as the first week in September; on the other hand, it is among the first to welcome the coming spring with its unfolding leaves.

There is another class sometimes named as desirable, but which is apt to become too large and unwieldy before many years have passed away. The European plane is one, and the white and yellow American elms are others. The elm is susceptible of injury from the elm leaf beetle; but where the English sparrow flourishes there is no danger to be apprehended from this source. But lately a destructive parasite, which destroys entire branches in a single night, has fastened on the elm.

A number of trees have been named as being among the possibilities for city street planting; but their merits are comparatively unknown, and they are not grown by nurserymen to any great extent. Many of these are to be found in Fairmount Park, and those particularly interested in the subject would do well to make personal investigation, and judge therefrom which would most likely fill the many requirements for a city street shade tree.—*Public Ledger.*

Forests and Snow.

A VERY interesting monograph bearing the above title has been issued by Mr. L. G. Carpenter, Irrigation Engineer of Colorado, from which the following excerpts are made. This monograph exhibits diagrammatically the diurnal variation in stream flow traceable to melting snow and the spasmodic influence of rain storms to emphasize the conclusions which the author presents. Further optical proof is afforded by a series of contemporaneous photographs taken to illustrate the effect of green timber in protecting snow, and of barren land or burned timber in encouraging the melting of snow.

While the climatic and topographical features of Colorado differ from those of Pennsylvania, the results of Mr. Carpenter's researches will prove of interest to our readers, and we give space to portions of the monograph:

"The intimate connection between the melting snow banks of the mountains and the agricultural prosperity of Colorado is too evident to those acquainted with the conditions of the State to need discussion, for most of the water which carries fertility to the fields and farms comes from the white-capped mountains; but even among those most interested in the agriculture of the State there have been some who have had a question as to the extent to which the forests were useful. Some have even advocated their destruction, under the supposition that the water supply would be increased.

"While it is not thought by the writer that the forests materially affect the rainfall in our Colorado mountains, their influence as a protecting cover for the snow and in saving it from premature melting and the effect of winds, which increase the evaporation, is an important function.

"The rain runs off quickly and may immediately influence the streams. The snow remains until it is melted or evaporates. Its effect is gradual, and may thus last for some time. Most of the winter precipitation in the mountains remains on the ground in the form of snow until spring. A portion, sometimes not inconsiderable, evaporates, especially when the snow is porous or soft. It may then be seen to visibly decrease. Heavy winds which blow the snow about increase this loss. Some of the mountain observers say, 'The wind just naturally wears it out.'

"In the case of land denuded of timber the surface is generally hard, and the water runs off rather than penetrates. In the forest areas the soil is looser, more porous and absorbent, and takes up water freely. In such areas springs, or springy soil, are more common, while they are rarely found in tracts burned over or denuded of timber. It is the water from these springs which maintains the flow of the rivers from September to April.

"April and May are the months of heaviest rainfall; most of the continued storms occur during these months. Yet our river records, now carried on for nearly twenty years, show that these rains have comparatively little effect. A rise in the river due to a storm is distinguishable from one due to melting snow. The snows show a daily tide, usually at the same hour. The rises due to storms are irregular in time and character. An unexpected effect is that rains in the mountains usually decrease the amount of water. The cloudiness associated with the storms prevents more thawing than the rain supplies.

"If the area covered by snow has been extensive and extends to a relatively low elevation, with the coming of warm weather the snow melts soonest on the low areas. As a rule these are less protected from the rays of the sun. Melting proceeds, even to considerable elevations, in the direct rays of the sun, though freezing may be going on at the same time in the shade, as on the north side of the ridges. A forest cover protects from the direct rays of the sun just as the ridges do.

"In the middle of the summer snow is to be found at moderate elevations only in the forests or under ridges where sheltered from the direct rays of the sun. As melting proceeds the tributaries are swollen, and the main streams increase in volume, their maximum being reached long before the greatest heat of summer. Though the melting is faster, the snow areas are so much less that the aggregate is reduced, hence, the stream decreases.

"That the forests in the mountains increase the amount of precipitation does not seem probable, whatever their effect when on the plains or lands of low elevation may be. The precipitation in the mountains is mostly due to the cooling from expansion, caused by the air being forced upward by the mountains. The effect of the forests would be so small compared with the mountains that it does not seem possible that they would increase the amount of rainfall. It, however, is not impossible that in the maintenance of moist conditions, influence on the currents of air, and the protection of slopes from the burning rays of the sun, there may be an effect even on the amount and distribution of the rainfall. Nevertheless, they influence the river floods, and protect the snows from melting and the action of the winds. As a protection from floods, they form a feature which the agricultural interests of the State should jealously protect."

The Teak Wood Industry of Siam.

THE issue of the United States Consular Reports for July, 1901, contains a very interesting article on the teak wood, contributed by Hamilton King, United States consul-general at Bangkok, Siam, which is one of the principal industries of that country. Teak is the most valuable wood used in connection with shipbuilding in the world, owing to the fact that moisture and drouth have no influence on it, nor is it liable to attack of borers and other insects so fatal to other woods. While it is strong and durable, it is easy to work, and is very light in the water. It is a beautiful, dark-colored wood, will take a high finish, and, owing to its peculiar qualities, resists the influence of close contact with iron. Up to this time there has been no wood substitute found to take its place for the backing of armor plates in war vessels.

Teak wood forests are restricted almost wholly to Burma, Siam and Cochin China. While some teak has been found in the island of Java, it is of a poor quality, and up to the present time the forests of Cochin China and a large portion of those in Siam are practically inaccessible. The limit of its production and the increasing demand for teak wood have presented a problem. The British government attempted to solve it by planting forests, many of which resulted in failures. The principal ports from which this wood is exported are Rangoon, Moulmein and Bangkok.

Teak forests are not forests as understood in this country, but the trees are found in swamps in the forests and jungles among other timber. The tree grows upon the mountain sides and in high broken country, and will average about one tree to every ten to one hundred trees of other kinds. Here the use of the elephant is absolutely necessary, owing to the dense jungle in which the trees are found, as it is utterly impossible to work horses in such places. Only the elephant, accustomed to making his way through the dense jungles which are indigenous in Siam, is strong enough to handle the logs and bring them to the streams.

About one-fourth of the teak wood of the world is furnished by Siam, and is equal in quality to that from Burma or Cochin China. These forests are situated several hundred miles from Bangkok, the capital of Siam, and the wood is brought down by means of the river Menam and its tributaries.

In these forests, which are leased for a term of years to the up-country traders, the trees are first "girdled," in order to make the wood lighter for land and water transportation, and to prevent sap rot. This operation must be completed at least two years before the trees are cut. The trees are then felled at the proper time and made ready for transport. They are afterwards hauled by means of elephants to the creek or small stream which is nearest to them. These several operations, girdling, felling and transporting to the creek, require a period of about three or four years, but it is after the butts reach the creek side that the most formidable causes for delay begin to operate. Even if the season should be favorable, and the brooks full of water, the logs float at a slow pace down them, and have to be worked forward with the aid of elephants by the process called "ounging," until they reach the larger streams. Here their progress is impeded by blocks and obstacles of all kinds, and the assistance of the elephant is

still required. The transport of a number of logs, after arriving at the large streams, to the rapids—about 150 miles—requires, on an average, about four months (in good seasons), and thence downward to Bangkok seven to ten weeks. Under the most favorable circumstances they may reach Bangkok in six months from the time of arriving at the main streams, or three and one-half years from the time of being girdled in the forest.

In Siam they suffer from drouth as in this country, and probably out of a period of ten years there will be full floods only during two or three years, three or four when the floods are of average height and duration, and the balance of the time will be "dry" years, only permitting of a very small quantity of wood being gotten out. Allowing for the average delay, from three to seven years must elapse from the time when the owner begins to expend money on the log, either in working or watching it, before returns are had. There is also, in addition to the above cost, a royalty to be paid to the lessor of the forest and government royalties payable on the main river.

Thus it will be noted that it takes a very large capital to engage in what is called the up country teak trade, and those who do get into this business must expect to have their money tied up for a long period before they will realize on their investment. The cost of handling teak in Siam has been greatly enhanced during the past ten years. The royalties to the government have increased 200 per cent., the price of elephants over 100 per cent., and the price of labor in the forests over 200 per cent., and to this has been added an advance in exchange, all of which works no good to the producer. The limited forest area from which the future supply must come, the refusal of the government to grant new concessions, restrictions placed on those now holding them, and the increasing demand, will naturally cause a rise in price in the near future. In northern Siam, beyond the headwaters of the Menam and Mekong rivers, are immense tracts of virgin teak forests. The Mekong river for 2500 miles from its mouth flows through this region; but on account of the waterfalls and rapids it is impossible to do any rafting, and, shut off as it is from the north, and inaccessible from the south by reason of the mountains, these forests will no doubt remain untouched for a long time to come.

The proper time to plant deciduous as well as evergreen trees is in the spring, as soon as the frost is out of the ground. Planting done before the heavy spring rains are over is surer of success than after the soil is dry.

Resolutions Endorsing a Pennsylvania Forest Training School.

—

At a meeting held in the Department of Public Instruction, in Harrisburg, on January 21, 1902, by the allied interests of agriculture, the following resolutions were unanimously adopted:

Resolved, That the Legislature of Pennsylvania be requested to furnish funds requisite for the establishment of a training school of Elementary Forestry at Graeffenburg, Adams County, where, on the State Reservation, the pupils may, by work done on State forests, earn what it costs the Commonwealth to board, clothe and educate them, provided said pupils furnish bond to repay the State what has been expended upon them if they fail on examination, or are discharged for misconduct.

Resolved, That the Legislature of the State of Pennsylvania be requested to appropriate $25,000 to provide instruction in forestry, and furnish equipment for this purpose at the State College of Pennsylvania.

The importance of this endorsement will be better understood when it is remembered that a population of 250,000 men was represented at this conference.

The former of these resolutions was also unanimously approved at a meeting of the State Board of Agriculture held in Harrisburg on January 22, 1902, and it may be added that this meeting represents the most active agricultural interests of the State.

It is but a few years since the Pocono region of Pennsylvania shipped large quantities of Christmas trees to Philadelphia and New York.

Last season (1901) merchants from Stroudsburg, at the foot of the Pocono region, came to Philadelphia to purchase Christmas trees from Philadelphia for Stroudsburg and vicinity. This fact is an unimportant one, except that it shows to what extent forest destruction has gone in Pennsylvania.

Hardwood ashes contain all the food-ingredients plants require from the soil, with the exception of nitrogen, but by their chemical action render the inert nitrogen of the soil available. Thus, by virtue of what they themselves contain, and what they enable soils to furnish, they constitute practically a complete manure.

New Members of the Pennsylvania Forestry Association.

—

SINCE the August, 1901, issue of FOREST LEAVES, the following persons have united with the Pennsylvania Forestry Association:

Andrews, F. L., New Bethlehem, Pa.
Bailey, Wm. L., 421 Chestnut St., Philadelphia, Pa.
Baker, Miss M. K., 115 S. 21st St., Philadelphia, Pa.
Baldwin, William A., Care Penna. Co., Pittsburgh, Pa.
Baumann, Mrs. Anthony, 1618 Penn Ave., Scranton, Pa.
Berwind, Miss Frederica, Wynnewood, Pa.
Biddle, Mrs. James S., 1714 Locust St., Philadelphia, Pa.
Bodine, Samuel T., 222 W. Rittenhouse Sq., Phila., Pa.
Bohlen, D. Murray, Chestnut Hill, Philadelphia, Pa.
Bonsall, Amos, 3731 Walnut St., Philadelphia, Pa.
Borie, Adolph E., South Bethlehem, Pa.
Brinckle, A. M., 136 N. 13th St., Philadelphia, Pa.
Brooks, Miss Frances A., 117 N. 33d St., Phila., Pa.
Brown, Maj. Isaac B., Harrisburg, Pa.
Buchanan, J. I., 323 Fourth Ave., Pittsburgh, Pa.
Chalfant, Henry, Pittsburgh, Pa.
Chestnut, John H., 601 Drexel Building, Phila., Pa.
Cliffe, George W., 6105 Baynton St., G't'n., Phila., Pa.
Christ, Chas. W., 338 N. 2d St., Philadelphia, Pa.
Collingwood, F., Elizabeth, N. J.
Craig, Hugh, Jr., 1917 Chestnut St., Philadelphia, Pa.
Craig, Joseph W., Sewickly, Pa.
Cuyler, Thomas De Witt, 1830 Spruce St., Phila., Pa.
Davis, Mrs. Henry C., 902 Spruce St., Philadelphia, Pa.
Day, Conrad B., 1516 N. 15th St., Philadelphia, Pa.
Day, Emory P., 237 S. 44th St., Philadelphia, Pa.
Delano, Warren, Jr., No. 1 Broadway, New York, N. Y.
Dempster, A., Stenton and Euclid Aves., Pittsburgh, Pa.
Dickson, Mrs. James P., Dalton, Pa.
Dimmick, J. Benjamin, 1730 Washington Ave., Scranton, Pa.
Dimmick, Mrs. J. Benjamin, 1730 Washington Ave., Scranton, Pa.
Donaldson, Francis, 2003 Chestnut St., Phila., Pa.
Douglas, J. Walter, 914 Walnut St., Philadelphia, Pa.
Downs, Norton, M.D., 215 W. Walnut Lane, G't'n, Philadelphia, Pa.
Duss, J. S., Economy, Pa.
Durant, Harrison, 228 W. Rittenhouse Sq., Phila., Pa.
Dutilh, Miss Emily, 311 S. Broad St., Philadelphia, Pa.
Eaton, John, 215 Water St., Pittsburgh, Pa.
Emerson, Charles F., Titusville, Pa.
Everson, B. M., 313 Sixth Ave., Pittsburgh, Pa.
Faries, Edgar Dudley, 307 Walnut St., Phila., Pa.
Fetherolf, J. M., Bureau of Forestry, Washington, D. C.
Fetterolf, A. D., Girard College, Philadelphia, Pa.
Fisher, Miss Elizabeth W., 1502 Pine St., Phila., Pa.
Fleming, Mrs. Lucy T., Chestnut Hill, Philadelphia, Pa.
Galloway, Wm., 3817 Walnut St., Philadelphia, Pa.
Gillespie, D. L., Bank of Commerce Bldg., Pittsburgh, Pa.
Graham, Chas. H., 1818 Spring Garden St., Phila., Pa.
Groves, A. P., Chestnut Hill, Philadelphia, Pa.
Guernsey, Joseph C., M.D., 1923 Chestnut St., Phila., Pa.
Gwinner, F., 1801 Market St., Allegheny, Pa.
Hacke, Paul H., Sewickley, Pa.
Haines, Alfred S., Westtown, Pa.
Heckscher, Miss Lucretia S., 260 S. 18th St., Phila., Pa.
Henry, Charles P., M.D., 1629 Race St., Phila., Pa.
Hensel, Hon. W. U., 50 N. Duke St., Lancaster, Pa.
Hirst, A. A., 211 S. 6th St., Philadelphia, Pa.
Hoffman, F. von, St. James Bldg., New York, N. Y.
Hogue, Mrs. Jane E., 100 Pelham St., G't'n, Philadelphia, Pa.
Humphreys, W. Y., Dallas Ave., Pittsburgh, Pa.
Hussey, John U., 1201 Park Building, Pittsburgh, Pa.
Hutton, Edward N., Chambersburg, Pa.
Kennedy, Mrs. W. D., 1717 Washington Ave., Scranton, Pa.
Kirk, David M., 910 Duquesne Way, Pittsburgh, Pa.
Laughlin, G. M., Pittsburgh, Pa.
Lewis, Mrs. Edward, 3234 Powelton Ave., Phila., Pa.
Marsh, J. W., Cor. Neville & Wallingford Sts., Pittsburgh, Pa.
Martin, Dr. Samuel A., Wilson College, Chambersburg, Pa.
Mellon, James R., 514 Smithfield St., Pittsburgh, Pa.
Mellon, W. L., 512 Smithfield St., Pittsburgh, Pa.
Moyer, Prof. John B., 5007 Penn St., Philadelphia, Pa.
McKee, Frederick W., 421 Wood St., Pittsburgh, Pa.
Orr, James P., Penna. Co., Pittsburgh, Pa.
Palmer, Wm. J., Colorado Springs, Colo.
Phipps, Lawrence C., 706 Carnegie Bldg., Pittsburgh, Pa.
Pinchot, James W., 2 Gramercy Park, New York, N. Y.
Pinchot, Mrs. James W., 2 Gramercy Park, New York, N. Y.
Platt, Miss Ella J., 610 Webster Ave., Scranton, Pa.
Potter, Hon. W. P., 304 S. St. Clair St., Pittsburgh, Pa.
Ramborger, Wm. K., 1000 Walnut St., Phila., Pa.
Robinson, Mrs. Moncure, Paoli, Pa.
Scaife, O. P., Pittsburgh, Pa.
Scaife, W. Lucien, 28th & Smallman Sts., Pittsburgh, Pa.
Speer, John Z., Dallas Ave., Pittsburgh, Pa.
Stewart, Miss Elizabeth Keith, Chambersburg, Pa.
Toumey, Prof. J. W., Yale Forest School, New Haven, Conn.
Townsend, John R., Bloomsburg, Pa.
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Vansant, Miss Belle, George School, Bucks Co., Pa.
Weiser, Charles W., Allentown, Pa.
Wheeler, N. P., Endeavor, Pa.
Whittekin, F. F., Tionesta, Pa.
Woodward, M. A., 432 Diamond St., Pittsburgh, Pa.
Woolsey, T. Salisbury, Jr., 250 Church St., New Haven, Conn.
Worcester, Wm. L., 4301 Spruce St., Philadelphia, Pa.
Worcester, Mrs. Wm. L., 4301 Spruce St., Philadelphia, Pa.
Young, W. J., 325 Fourth Ave., Pittsburgh, Pa.

Italics indicate life members.

New Publications.

—

Important Philippine Woods. By Capt. G. P. Ahern. Small quarto, 112 pages, bound in cloth, illustrated by colored plates. Forestry Bureau, Manila, P. I.

Capt. Ahern, who is in charge of the Forestry Bureau of the Philippine Islands, has prepared this excellent work because of numerous inquiries which have been made as to the forest resources of these islands, markets, etc., and it will greatly facilitate the preliminary investigations of American lumbermen. Extracts are given from the forestry regulations, together with lists of both the popular and scientific names of the tree species.

The State forests cover from one-fourth to one-half of the area of the Philippine Islands, viz., from 20,000,000 to 40,000,000 acres, and there are now listed 665 native species. There is a good demand for timber, but the means of communication and labor are poor. Fifty of the more important woods are described in detail, the greater portion of them being illustrated by colored plates, showing the leaf and fruit, and in some instances the flower of the different trees. One article also treats of the anay, or white ant, so destructive to wood, and mentions those species of timber which are exempt from its ravages. Tables also show the physical characteristics of the different woods. Other chapters give the uses to which the principal woods are put; a list of the books consulted and authorities cited are also included. The Report is one which is invaluable to any one who desires to be informed on the timber of the Philippine Islands, and we would advise all such to procure a copy of the publication.

Ornamentals for South Dakota. Bulletin 72 of the U. S. Experiment Station. 8vo., 112 pages, illustrated. Brookings, South Dakota.

This Bulletin contains interesting data as to ornamental trees and shrubs in South Dakota, giving the reasons for planting them, the losses in and care after planting, and where to plant; lists ofdeciduous trees and evergreens, as well as of the varieties which are winter killed, native species worthy of cultivation, together with a list of varieties recommended for general cultivation.

Tree Planting on Rural School Grounds. By Wm. R. Hall. 8vo., 40 pages, illustrated. Farmer's Bulletin 134, U. S. Department of Agriculture, Washington, D. C.

This paper was prepared by Mr. Hall, Assistant Superintendent of Tree Planting of the Bureau of Forestry, and deals with the present conditions and needs of rural school grounds, indicating methods for their improvement, principally by means of tree planting. Full directions are given as to how and what trees to plant, ways of obtaining trees, also the care of them when growing, hints for studies for teacher and school in regard to trees and soil, etc. It would be well if all of our rural teachers were supplied with a copy of this paper, which can be obtained by writing to the Department of Agriculture, Washington, D. C.

Forest and Water. By Abbot Kinney. 247 pages, 53 illustrations. Post Publishing Company, Los Angeles, Cal.

This book was published in 1900, but for some reason has but recently reached our table. It is difficult to review briefly a book which covers so wide a field, though one may say it is interesting throughout.

The book is written mainly in the interest of forestry on the Pacific slope, though there are certain general principles elucidated which would apply here as well.

There is but little in it which relates to the technique of forest restoration. There are interesting chapters on the trees and animals of the Arizona and California regions, and a number of other chapters on the relation of water to irrigation.

The evils of forest fires and the desolation wrought by large droves of sheep in search of pasture are vividly and truthfully portrayed.

It will certainly do the average Californian good to read and reflect upon the contents of Mr. Kinney's book, and a perusal of it on the Atlantic slope would be helpful to the forestry interests.

J. T. R.

Forest Trees and Forest Scenery. By G. Frederick Schwarz. 12mo., 183 pages, illustrated, bound in cloth. Published and for sale by the Grafton Press, New York, N. Y.

In the preface the author states that he has made simple inquiries into the sources of beauty and attractiveness in American trees. The forest trees are divided into two classes, the broadleaf trees and the cone-bearing, and they are further classified into those which are beautiful, those which are common and familiar, and those which are important for both the present and future on account of their extended geographical distribution, giving brief descriptions of some of our native forest trees, such as the oaks, maples, birches, sassafras, chestnut, elm, dogwood, tulip tree, pines and firs of different varieties, hemlocks, redwood, etc. A chapter is devoted to forest adornment, showing the aid of shrubs, ferns, etc., in decorating the forest floor, while vines and creepers also add to the general effect, the birds and smaller animals giving life and action to the scene. The distribution of the forests, the character of the broadleaf forests, and the difference of their growth in different sections of the country, while the coniferous forests are also considered; the book closes with a chapter on the artificial forests of Europe, which is introduced by way of contrast with our own natural forests, but with which, in the future, we may become more familiar. The book is written from an æsthetic standpoint, and the handsome illustrations add to the attractiveness of the book.

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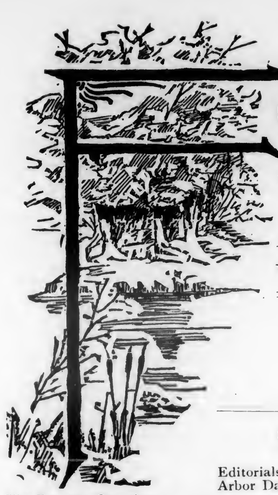

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FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

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EDITORIALS.

THE year 1902 will be remembered as 1862, 1869 and 1889 have been, because an extended area of the eastern part of the country suffered from severe freshets which paralyzed railroads and telegraphs, destroyed buildings and bridges, crippled industries, overflowed much property, and left in its wake a layer of mud and a record of serious damage amounting to millions of dollars.

Preceding the visitation of the freshet, a sleet storm wrought havoc, the effect of which will long be evident in damage to trees by the breaking off of limbs, extending often to the rupture of the trunks. Many of the wounds inflicted will cause permanent damage by reason of the fractures encouraging rot which may extend and shorten the life of the tree, or at least injure the portion of the trunk valuable for lumber.

The extent to which the freshet flow could have been controllable by large impounding reservoirs is open for discussion, but that its severity would have been mitigated by large areas of woodland upon the watersheds of various streams seems evident. The frost which compacted the soil early in the winter made it practically impervious to the slowly melting snow which had been deposited upon frozen ground. This was especially the case in exposed areas; but in the forest the frost penetrated to less depth, and the porous character of the forest floor encouraged a more liberal absorption of moisture from the snow. The protection given by the trees from the warm winds and heavy downpour also assisted in reducing the run-off from areas so covered. In the open country the wind and rain, attacking the snow which lay upon the practically impervious frozen soil, caused a run-off which has seldom been equalled, and resulted in streams rising to abnormal heights, doing an immense amount of damage.

While such freshets have no defined cycle of recurrence, they are a constant menace to valuable property, and threaten serious loss to diversified industries. The money damage to railroads, telegraphs, industrial establishments, and the interference with travel or with the product of manufactories is not local, but affects the stockholders or proprietors of these in various parts of the country. Consequently, any method of amelioration should command the support of the general public. In no way can this amelioration be secured as well as by preserving and protecting forests upon such portions of the drainage basin of streams as are better adapted to arboriculture than to agriculture.

* * * * *

In our February issue attention was called to the fact that the *Forester*, the organ of the American Forestry Association, had been merged with *Irrigation*, and was now issued under the title of *Forestry and Irrigation*, but, through inadvertence, proper notice of this new journal failed to appear in our columns. We welcome *Forestry and Irrigation* as a neat publication, covering very important subjects which are closely related. Its make-up and contents are attractive, and we wish for it the fullest measure of success. The wider publicity that can be given to the forestry movement, the more quickly will the people of the country appreciate its importance. We trust that *Forestry and Irrigation* may continue to be a most active factor in developing public sentiment in favor of forest reserves and forest care.

* * * * *

The Pennsylvania Forestry Association will hold, through the courtesy of the Managers of Haverford College, Arbor Day exercises at Haverford, Pa., on Friday, April 4th, at 4 P.M. There will be short addresses and tree planting, followed by light refreshments.

Mr. George Abbott, of Philadelphia, advocates the planting of oak trees along streets in Florida towns, also the liberal use of palms, especially around the margins of the lakes, to beautify the town.

Orlando, Fla., is not exempt from frosts, but he found that there were nineteen varieties of palms which had this year resisted several frosts, and other hardy palms of which no specimens were observed. The suggestion is a commendable one, and if carried out will be a great aid in beautifying some of our Florida towns.

Arbor Day Proclamation.

In the Name and by the Authority of the Commonwealth of Pennsylvania. Executive Department. Proclamation.

THE growing demands of our industries have in recent years brought about such a rapid destruction of our forests that it became necessary to take active steps for their rehabilitation.

The Forestry Department of Pennsylvania is rapidly acquiring forest lands and establishing forestry reservations, and efforts in this direction will be productive of great good; but if the ends sought are to be accomplished, it is of vast importance that trees be planted upon the unproductive lands of the Commonwealth, in order that the damage already done may be in part, at least, repaired.

The recent floods have again emphasized the danger in further reducing the wooded areas. If the unproductive lands of the State were adequately protected by trees, the heavy rains would pass into the streams more slowly, and the loss to the Commonwealth would be infinitely less.

Owing to the frequent floods and resultant muddy and impure water, the cities and towns of the State are fast realizing the necessity of obtaining their water supply from the headwaters of the streams. Almost all the towns in the State can have pure water if forest areas are maintained at the source of suitable streams. These conditions make it the duty of every citizen to aid in this beneficent work, which affects not only the State at large, but each individual in the Commonwealth.

In order that our citizens, both young and old, may have an opportunity to continue to contribute their share in this laudable work,

I, William A. Stone, Governor of the Commonwealth of Pennsylvania, in accordance with law, do hereby designate and proclaim Friday, the fourth day of April, and Friday, the eighteenth day of April, A.D. 1902, to be observed as Arbor Days throughout the Commonwealth. Two days are set apart for the observance of this custom. Inasmuch as the climatic conditions may render one of these days more favorable for the purpose intended than the other, the selection is left with the citizens of the various sections of the Commonwealth.

Given under my hand and the Great Seal of the State at the City of Harrisburg, this fourteenth day of March, in the year of our Lord one thousand nine hundred and two, and of the Commonwealth the one hundred and twenty-sixth.

WILLIAM A. STONE.

(SEAL)

By the Governor:

W. W. GRIEST,

Secretary of the Commonwealth.

The Forestry Question.

IN regard to the proposed School of Forestry at Graeffenburgh, the Doylestown *Republican* of January 24th has the following:

"The State Board of Agriculture has endorsed the suggestion of Forestry Commissioner Rothrock that forestry schools be established by the State. A resolution was adopted urging that the Legislature of Pennsylvania be requested to furnish the funds requisite for the establishment of a training-school of elementary forestry at Graeffenburgh, Adams County, where, on the State reservation, the pupils may, by work done on State forestry, earn what it costs the Commonwealth to board, clothe and educate them, provided said pupils furnish bond to repay the State what it costs to educate them if they fail on examination, or are discharged for misconduct. Whether this would be the best plan to provide instruction is an open question, but the purpose is admirable. It might be better to let students of forestry provide for their own education, as they do in other callings, which would have a tendency to keep out all who were not truly interested in the science. They could then enter the employ of the State as is done in other departments. The provision as to filing bonds in event of failure to pass examination is rather far-fetched. It anticipates the presence of pupils who would take advantage of the opportunity to obtain board and clothing free. If there is this imperative necessity for more intelligent, systematic and thorough work in forestry, and none will doubt it, the men competent to engage in it will be forthcoming without schools of this character. Let the compensation be such as to invite capable and conscientious young men to make it their calling, and they will acquire at their own expense the education necessary to render efficient service. Those having a taste for the work will make rapid progress. But aside from the methods by which they are to be educated, there is urgent necessity for more comprehensive work in forestry, and the State should regard the matter as one of the most important with which it has to deal. Dr. Rothrock and others have accomplished valuable preliminary work after years of arduous toil, and the time has arrived when there should be concerted effort on the part of the people, as well as the Legislature, to prosecute the work with the utmost vigor. Had this been done years ago, there would now be a large corps of experienced men ready to engage in the work. It is not a matter in which a trifling or desultory policy should prevail."

We welcome either commendation or criticism from the Doylestown *Republican*. Whatever it publishes is honest and carefully considered.

We think, however, that our contemporary has missed the essential points in favor of this proposed school. It is not intended to stand in the way of, or in place of forestry schools connected with well-established institutions of learning where forestry will be taught as a high science, and only the best trained men graduated.

The mission of this proposed school is humbler, but nevertheless of pressing importance.

The facts are these: The State is now in actual possession of several hundred thousand acres of land on which it proposes to restore the forests—if possible.

It is not necessary to argue the importance of this purpose, for that is now granted by everyone whose opinions are of any value.

The only question is, how shall it be done? First of all, the most serious obstacle to forest reservation is the spring and autumn fires.

These never start of themselves. They are always started by some person or some thing, and never should be started. There is no occasion for their starting. When such a fire is first created, a few resolute, trained men, as a rule, can suppress it, unless the wind is high and the season a dry one, both of which conditions were present in the spring of 1900, when our fires were so disastrous. It is, however, almost impossible to secure the help of such resolute, trained men. The most fatal mistakes are constantly made by the very men sent out to suppress these fires.

Now, it happens that at Graeffenburgh there is every prospect that in the near future the State will be owner of almost 40,000 acres of land, and in the middle of this are already buildings which are admirably adapted to housing all the help required on the reservation.

Besides fire fighting, there are roads to be made, nurseries to be established, planting and thinning of young trees to be done. There is mature timber to be removed, and there are years of surveying in sight. Then, too, during spring and fall this ground would be guarded to prevent forest fires; and, as the guards should be authorized to arrest any one who violates the forest laws of the State, it is necessary that they should be familiar with those laws.

Most of this work requires a degree of special training which the day laborer does not possess. And the conditions which are now pressing upon the reservation in the South Mountain will shortly exist on all the other reservations.

To have this work done will cost money. If we employ the ordinary adult laborer, he will simply regard it as a day's work. If we employ

younger men to do it, they will be willing to study elementary forestry because they will see in it the prospect of a life work. They will have no ties which prevent them from going to any part of the State when their services may be required. They will have the same pride in their special calling that members of any other calling have. They will not be mere day laborers! Their education and living will be the pay received for work done now on the reservation where it is urgently needed, and which must be paid for in some form at any rate.

But why the bond to repay the State for money expended on these young men if they fail to become proficient in their work?

Because the State should not be asked to give something for nothing; and these young men would most of them be unable to raise the money to pay in advance for their education. The mere fact that a young man could secure an acceptable bondsman would be a reasonable guarantee that he was a youth of good character where he was known, and that he could be depended upon.

Let us have our colleges of forestry by all means; but let us have, also, trained laborers *now*, at *once*, on the State's own ground! The need for them is urgent!

We believe, with the *Republican*, that this "is not a matter in which a trifling or desultory policy should prevail," and we thank it for the words so bravely spoken. J. T. R.

Abstract of Pennsylvania Forestry Laws.

THE Department of Forestry has published a pamphlet of the laws relating to forestry, entitled "Pennsylvania Laws Relating to the Department of Forestry, Forestry Reservations, Timber Lands, Roadside Trees, etc," copies of which can be obtained by application to the Department of Forestry, Harrisburg, Pa. The following is a brief abstract of the laws:

By an Act approved March 31, 1860, any person setting on fire any woods, lands or marshes, can be sentenced to pay a fine not exceeding $100, and an imprisonment of not more than twelve months. Any person cutting down timber without the consent of the owner, or who knowingly purchases or receives such, can be fined not to exceed $1000, or be imprisoned not more than one year, while any party cutting down a bounded tree or landmark can be fined not over $500 and imprisoned not to exceed one year.

The Act of April 9, 1869, imposes a fine of not more than $500 nor less than $50, or imprisonment not exceeding one year, nor less than thirty days, or both, on persons who intentionally set fire to timber lands in Union County; and the same law was later extended to the counties of Schuylkill, Berks, Lehigh, Centre, Snyder, and Luzerne.

The Act of May 4, 1869, makes it unlawful for any owner of any individual interest in timber land to cut or remove any timber without the written consent of all co-tenants, the latter having every remedy in law and equity for the recovery of the trees and securing damages.

By the Act of June 11, 1879, any person wilfully setting on fire any woodlands, barrens or moors, is punishable by a fine not exceeding $300 or imprisonment for not more than twelve months, or both. If convicted, the County Commissioners are to pay the prosecutor $50, which is to be paid by the defendant.

The Act of June 13, 1883, made it incumbent on the Assessors of the State to make returns of the number of acres of timber land.

By the Act of June 1, 1887, any person planting not less than 1200 forest trees to the acre is entitled to receive annually for the first ten years a sum equal to 90 per cent. of the taxes, or so much of the 90 per cent. as shall not exceed 45 cents per acre; for the second ten years, 80 per cent. of the taxes, providing it does not exceed 40 cents per acre, and for the third and final ten years 50 per cent. of the taxes, if this does not exceed 25 cents per acre, and after the trees have been planted ten years they can be thinned down to not less than 600 trees to the acre; but the law does not apply to nurserymen. The Act as amended by that of March 22, 1901, also applies to land which has been cleared of merchantable timber, upon which at least 1200 young trees to the acre are maintained. Any person who cuts, burns or injures any tree, who kindles a fire on or carries any lighted candle, lamp, torch, etc., without securing it in a lamp, or discharges fireworks, in the timber lands of others, or makes a fire on their own land which is communicated to timber land belonging to others, is subject to a penalty of $100 (this was originally $50, but was made $100 by the Act of May 14, 1901), and costs for each offense; and if this fine is not paid, be imprisoned not less than one day for each dollar of penalty. Any justice of the peace, upon affidavit being made of the violation of the Act, shall issue a warrant of arrest for the offender.

The Act of June 2, 1891, provides for the appointment of three viewers to assess any damage done by reason of the cutting of trees on any turnpike, public road, street, lane, alley, or highway, or on enclosed or unenclosed land, by any telegraph, telephone or electric light company. The compensation of the viewers to be paid by the defendant. But the Act does not apply to the police patrol or fire department telegraph lines.

The Act of March 30, 1897, makes it obligatory, when unseated lands are sold for taxes, that they be published in two newspapers. and ten copies of the advertisement be sent to the Secretary of Agriculture and the Commissioner of Forestry, the latter inquiring into and examining the lands, purchasing such as are desirable for a forest reservation at a price not exceeding the amount of taxes. He is also empowered to purchase other unseated lands from the owners, provided it is approved by the Governor and the Board of Property. The Secretary of Agriculture is to keep a record of each tract purchased, but Foresty Division is to care for them.

Another Act of March 30, 1897, makes constables of townships ex-officio fire wardens for the extinction of forest fires, who can call upon any persons for assistance, the fire wardens receiving 15 cents per hour, and the persons assisting 12 cents, one-half being paid by the State and one-half by the county, but no county can be called upon to pay more than $500 in any one year. Anyone refusing to assist the fire wardens shall pay a fine of not more than ten dollars or undergo imprisonment of not over 30 days, or both. The fire wardens of each township are to make returns to the Court of Quarter Sessions of all violations occurring within their townships, and if this is wilfully neglected, the Court shall suspend him from office, try him, and if found guilty he shall be fined not over $50 and undergo an imprisonment not exceeding three months, both or either. This does not include an area of timber or brush land less than fifty acres in extent, unless it is liable to convey fire to a larger tract.

The Act of April 29, 1897, authorizes constables and other peace officers, without first obtaining a warrant, to arrest persons reasonably suspected by them of offending against the laws protecting timber lands.

The Act of May 25, 1897, provided for the purchase of three forestry reservations of not less than 40,000 acres each, situated respectively on the headwaters of the Delaware, the Susquehanna and the Ohio Rivers. Said land to be better suited to the growth of trees than for agriculture or mining, fifty per cent. of the land having an average altitude of not less than 600 feet above sea level. (The provisions of this have mainly become inoperative by the passage of the Act of February 25, 1901.)

By the Act of July 15, 1897, the first section of the Act of June 2, 1870, was amended, so that it is the duty of the County Commissioners to appoint persons to ferret out and bring to punishment all persons causing the burning of woodlands, and take measures to have the fires extinguished, non-compliance being punishable by a fine not exceeding $100, or imprisonment not over two years, or both. One-half of the expense incurred in the employment of the persons to be borne by the county and one-half by the State, but in no case shall the expense to the Commonwealth exceed $500 in any one county in any one year.

The Act of March 22, 1899, makes constables of townships and boroughs ex-officio fire, game and fish wardens, with authority to arrest, without warrant, any one found trespassing the laws, and they are authorized to make searches of boats, game bags, etc. The constable receives, on the conviction of the person, ten dollars for his services, one-half being paid by the county and one-half by the State, but the county is not liable for more than $500 in any one year. The constables are also required to report all violations of the forest, fish and game laws to the Court of Quarter Sessions, and provides a penalty for failure to do so of $50, or two months imprisonment, or both.

The Act of February 25, 1901, establishes a Department of Forestry, to consist of the Commissioner of Forestry and four other citizens, constituting the State Forestry Reservation Committee, with all the powers of the former Commissioner of Forestry and Forestry Reservation Commission, and, in addition, have full power, with the consent of the Governor, to purchase any lands in the State for forest preservation, provided the amount paid for any tract does not exceed five dollars per acre. The Commission has full power over all forest lands, and can dispose of the timber, or execute leases for mining, one-half of the money so received going to the township in which the land is located, provided that there shall not be paid in any one year more than twice the amount of taxes the township would have received from the lands if owned by individuals. Any persons kindling fires on the forest reservation, except in accordance with the rules, or who shall cut or remove or damage the timber, upon conviction shall pay a fine of not less than $500 for each offence, with costs, and if this penalty is not paid will be imprisoned until it is. The Forestry Commissioner is the head of the State Forestry Reservation Commission, and under it has the control and management of all State forest lands. He shall also encourage the development of forestry, publish information in regard to the extent and condition of forest lands, aid in enforcing forestry laws, etc., to secure which he can employ detectives and pay for legal ser-

vices. The Commissioner of Forestry is to receive a salary of $3000 and expenses per annum, and shall have an office at the State Capitol. The manner of payment of money for purchased lands is specified. The lands purchased shall be free from taxes, and where public roads run through such lands the Commission is authorized to spend $25 per mile for repairs, or one-half of that amount if the road borders the reservation. The Commissioner is required to give a bond in the sum of $10,000.

By the Act of April 11, 1901, owners of land having on it forest trees averaging not less than 50 to the acre, the trees being at least eight inches in diameter at a height of 6 feet above the ground, are entitled to receive a rebate from the County Treasurer equal to 80 per cent. of all local and county taxes, or so much thereof as shall not exceed 45 cents per acre. No one property owner can receive a rebate on more than 50 acres.

The Act of May 2, 1901, authorizes the Commissioner of Forestry, when application has been made by residents of the county, and the Commissioners of the County, as required by the Act of July 15, 1897, have failed to act, or appointed inefficient persons, then the Commissioner of Forestry can appoint detectives to ferret out and bring to punishment those who cause the burning of timber lands, and the fines collected will be paid to the State.

The Act of June 17, 1901, empowers the Burgess and Council of any borough, on petition of a majority of property owners upon any public street, to require the planting and replanting of suitable shade trees along and upon either side of the street, and upon any owner failing to do this, the authorities can plant the trees at his expense.

The Act of July 2, 1901, allows a rebate in the road tax of one dollar for every two trees planted along the roadside by the property owner, but no row of elms shall be placed nearer than 70 feet, maples or other forest trees than 50 feet, except locust and Carolina poplars, which may be set 30 feet, and fruit trees 40 feet apart. The trees must be set out in the year previous to the request for abatement. Any trees growing naturally along the roadside, or those that are replanted to replace dead trees, shall be allowed for in a similar way, but the rebate is not to exceed one-quarter of the road tax. Any person killing or injuring any of these trees, or permitting a horse or other domestic animal to injure them, is subject to a penalty of not less than one dollar or more than five dollars, and the costs of the suit, for each and every tree, and if this is not paid, be committed to jail for a period of not less than one day for each dollar. The owner of the land may remove the trees on which an abatement has been made if he plants other trees in their place or refunds the abatement allowed. All penalties collected form part of the road fund of the township, and the supervisor of roads is to keep a permanent record of all trees on which abatement has been made, and make a proper note when they are removed.

Propagation of Forest Trees.

MR. GEORGE H. WIRT, Forester, has prepared for the Department of Forestry of Pennsylvania an instructive 38-page pamphlet entitled "Propagation of Forest Trees Having Commercial Value and Adapted to Pennsylvania," which should be in the hands of all persons who are interested in forest nurseries, and can be had on application at the Department at Harrisburg.

The location of the nursery is first treated of, taking into consideration the fact of whether a permanent or temporary one is desired, with recommendations as to the land and soil to be used. Methods of bedding, watering, weeding and shading are all, in turn, taken up.

The following remarks in regard to seeds and sowing are excerpted verbatim:

Choice of Species.—In determining the species to be raised, it is well to observe what trees are growing in the locality, not only within wooded districts but also along fences and in fields. They will give an idea of the quality of the soil and of what may be expected in the future, although this is not always the case, for other better species may have been forced out by some cause. Find out when these trees will have a good crop of seeds, and then have everything ready for work when it comes. Not all trees bear seeds every year, as in the case of some oaks and conifers the period varies from two to five years, or even longer. Nor do all seed years produce a full crop of good seeds, as in the case of the tulip-tree. Then some seeds ripen in early summer, although those of most trees do not ripen till fall, or even winter. From among those trees in the neighborhood, if they are the proper species, select the healthiest ones, and gather their seeds as soon as ripe.

Time of Sowing.—Seeds of the poplars, soft maple, white elm, paper and river birch, and others maturing in summer, should be sown at once. They lose their power of germination in a short time. Seeds of oaks, hickories, walnuts, conifers, and others which mature in fall, may be sown at once. The freezing and thawing of winter may be beneficial to them, but the destruction that is likely to occur by squirrels, mice and birds, is sufficient reason for not planting until spring, if the seeds can be preserved properly. They should not be allowed to dry out before planting, nor should they be exposed constantly to much moisture if they are to be kept for any length of time.

Thickness of Sowing.—By making tests, either by cutting seeds or by placing them between wet flannels in a warm room, so as to produce germination, or by some other method, the percentage of good seed is determined, and from this the thickness of the sowing. It is very easy to sow too thick, and then the seedlings will be weak; but it is cheaper to thin out, and perhaps set the young plants in other ground, than to have to fill up blanks.

Depth of Sowing.—The difficulty, in too many cases, has been that instead of the seeds being planted, they are buried. As a general rule, for depth of cover, the diameter of the seed is sufficient, but if the ground is left very loose, or if there is danger from frost late in spring, a heavier covering should be given. It is well, after sowing, to roll the beds or to press the ground with a spade or a board. In fall sowing cover the beds with a layer of leaves. It will prevent the ground from heaving during the time of frost, and in the spring will prevent the heavy rains from washing out the seeds. This may be done to advantage, too, after spring sowing. In both cases a careful watch must be kept, and as soon as the seedlings appear the leaves should be raked off. Branches might then be spread thinly over them to keep the birds away, but these should not be left on too long, so as to in any way interfere with their growth. Small seeds may be coated with red lead as a protection against birds.

Manner of Sowing.—As a usual thing the smaller seeds are sown broadcast in the nursery, especially those of the conifers, the ash, the birch, etc. The larger seeds, as those of the oaks, hickories, walnuts, etc., are usually sown in furrows, or rows, from six to twelve inches apart, on the nursery beds. The latter are often sown in rows where the plants will remain permanently. This may be advisable with taprooted species. Broadcast sowing over a plantation is very expensive, and is very seldom done.

After the young trees have remained in the seed beds for one season, they may be set out where they are to stand finally, especially broad-leaved ones. The spruces and firs grow very slowly during the first four or five years, and may best be left two years in the seed bed, then transplanted to other nursery beds and allowed to remain there two or three years.

Transplanting can be done either in the fall or spring, but the latter is preferable for conifers. It is very important that the roots should never become dried out, and they should be covered with wet burlap or moist moss. Any broken or bruised roots should be carefully cut off. The best methods for planting in different soils are given, together with short descriptions of a number of our native trees, and directions for gathering and sowing the seed of each.

By following the directions given in this pamphlet, any inexperienced person should be able to raise in an inexpensive manner and with reasonable success whatever trees might be needed.

Protection for New Jersey's Forests.

RAVAGES of forest fires in South Jersey have become more costly with each succeeding year. The State Forester places the low estimate of $10 per acre upon the pine timber lands in Atlantic, Camden, Burlington and Cape May Counties, and in these the average rate of destruction is from 60,000 to 100,000 acres a year. The Minch bill, now pending in the State Senate at Trenton, is an effort to save what is left of the forest lands, involving a system of policing to be paid for by the localities to be benefited. Salaried officers known as Fire Marshals are to be instituted, and to these and their aids will be committed the enforcement of the proposed statute. It is scarcely probable that the legislative device will abolish the evil complained of; but it is a step in the right direction which should be taken without undue delay.

There now remain nearly 1,800,000 acres of "piney woods" in the southern section of New Jersey, and this territory is of great value to the material interest of the adjacent population, clustered chiefly in towns along the coast and the Delaware Bay shore. The entire region is still a paradise for huntsmen, a refuge for weary men tired of the grind of city life, and a sanitarium for those whose vital energies have been wasted in regions less favored by nature. Stretching far away over mile after mile of apparently desolate wilderness, the South Jersey woods holds within them the secrets of healing and the potency of material prosperity for all dwellers on their borders.—*The Record.*

The British Government is about to appoint a committee to arrange for replanting the woodlands in Scotland.

Protected and Unprotected Woodlands.

WE furnish in this number two illustrations, both taken from Pike County, in this State. They are in no sense peculiar, because the like of them can be found in a thousand other places within the limits of the Commonwealth. They are important, however, because they convey, in no doubtful manner, the impression that it is possible for a forest to be restored after it has once been removed.

There are, of course, two methods by which such restoration might occur. The one is by natural agencies alone, and the other is by well-directed human effort.

We might almost say that there was a third form—that is, where the above methods are combined. The natural tendency in this State is toward forest restoration. Indeed, one can say with certainty that if the State were abandoned by men, that in a single century it would probably be almost wholly covered again by trees. This would be in the highest degree unfortunate, for there is no one so insanely in love with forests as to desire to see them take the place of our prosperous civilization.

The statement is merely made to enforce the fact that forest restoration is possible within our limits.

One of these illustrations shows the condition of the average fire-swept woods. The other shows a forest which has been protected for twenty years against fire, though receiving but little other care.

The State "Blaze."

IT has been the custom for guides and pioneers who go into an unknown wilderness to carry an axe or light hatchet in their hands, and by a quick, dexterous blow to remove enough bark from a tree along the trail to enable them, or other persons, to go over the same route again.

The convenience of this method of fixing lines and marking corners in land tracts has long been recognized, and therefore the method has been utilized by surveyors and engineers in establishing their lines.

A recent article in FOREST LEAVES, by Mr. George Wirt, illustrated and explained how these marks remained to identify a "corner" a century after they were made.

The common "blaze" is a mere flake of bark a few inches long and half as wide, removed from the side of a tree, deep enough to expose the wood. If the line ran through a tree two blazes were made,—one where the line was supposed to enter and the other where it was supposed to leave the tree. If the tree was not on the line, but a little to one side, the blaze was made on that side of the tree toward which the line ran.

In order, however, to indicate the State blaze, so that anyone might know when they were on State Reservation Lands, a peculiar form of marking has been adopted. Taking a tree on or near the line, an X was cut upon it on the side toward the centre of the tract. This X was made, *if possible*, at least a foot in length. Now, anyone can see that above the centre of the X, and below but within the limits of the letter, there is a triangular space. From neither of these spaces was the bark removed. But, on the other hand, from the horizontal spaces between the arms of the X the bark was removed down to and exposing the wood. Then a good coat of white paint was applied to the X. This enables one to recognize the mark at a considerable distance, and there is no danger of confounding it with any other mark.

It is, moreover, very easily and quickly made by any one who can handle an axe properly.

It is not to be understood that this is the only "blaze" adopted on the State land. On the contrary, the ordinary, simple blaze is made and painted white for most of the marking. There are just enough of the X blazes made to leave one without excuse for trespassing on State lands.

J. T. ROTHROCK.

How Much Pennsylvania Has, and How Much It Ought to Have.

THE map of the State of Pennsylvania, which we have given in this issue, shows in the interior, smaller square, the proportion of land which the State now possesses to the entire area of the State. The larger outer square shows what we ought to have as forest reservation. These squares are not intended to show where the State lands are, or where they ought to be, but are simply placed in the centre of the State to indicate proportions. The larger square represents about four million acres. It is entirely safe to say that this quantity of land might not only be wisely devoted to growth of trees, but that it would be better for the State if it were so.

Of course it will be a long time before this ideal is reached. Indeed, it may never be, though we think it possible in the future.

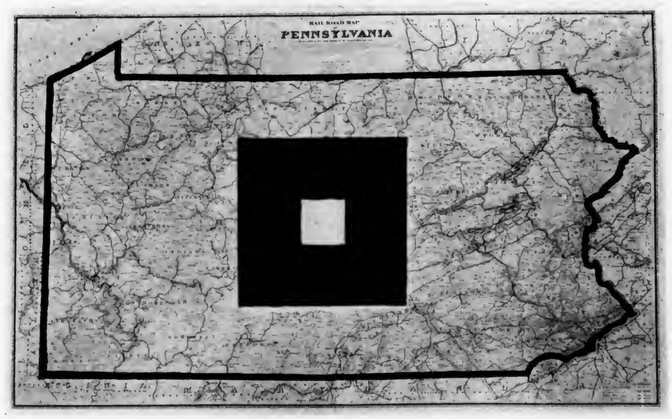
Meanwhile the work of State acquisition of land is steadily going on. There is now about 100,000 acres in process of purchase, in addition to what is already bought. J. T. ROTHROCK.

BLOOMING GROVE, PIKE COUNTY, PENNSYLVANIA.—WOODS PROTECTED 20 YEARS.

PIKE COUNTY, PENNSYLVANIA.—WOODS UNPROTECTED.

FOREST LEAVES, VOL. VIII., NO. 8.

A PENNSYLVANIA STATE BLAZE.



WHAT LAND PENNSYLVANIA HAS AND WHAT IT OUGHT TO HAVE IN FOREST RESERVATION.

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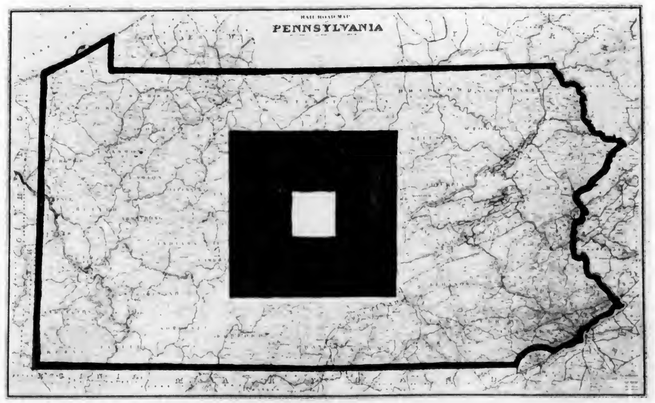

WHAT LAND PENNSYLVANIA HAS AND WHAT IT OUGHT TO HAVE IN FOREST RESERVATION.

INTENTIONAL SECOND EXPOSURE

The Spruce Destroying Beetle.

THE United States Division of Entomology has just reported on one of the most destructive forest depredators known to science. It is the bark-mining and spruce-destroying beetle.

From the ravages of this insect the great spruce forests of Maine, containing billions of feet of lumber, valued at millions of dollars, have been damaged, and it is predicted that, unless this forest enemy is exterminated, in the course of a decade or so all of the virgin forests of spruce in that section of the country will be killed.

Owing to the gravity of the situation the Government sent out a special investigator, Dr. A. D. Hopkins, who has studied forest insects for years, and is generally known as the leading entomologist of the country. He returned recently from the spruce growing region of New England, and prepared a report on the visible evidences of the spruce destroyers' work, together with methods to prevent their future invasion of living timber.

Dr. Hopkins conducted investigations during the past summer in the heart of the Northwestern Maine woods, in localities where the spruce were dying by the thousands. The infested living, dying and dead trees all bore evidence of having been killed by the beetle. The adult varies in length from 3-16 to 5-16 of an inch, and in width from 1-16 to 2-16 of an inch. The larva, when hatching from the egg, is a minute, white, legless grub, which feeds on the inner bark and increases in size until it has attained a diameter equal to that of the adult. As to the life history of the beetle, there is but one brood in a season, and the period of development from the egg to the adult is about seventy-five days. Their destructive work begins when they emerge from winter quarters, about the middle of June, and continues until the first of September. The broods of the beetle do not remain in a dying or dead tree more than one year after it commences to die. Dr. Hopkins estimates that an average of three pairs of beetles to the square foot of bark on ten to fifteen feet of the trunk of an average sized tree are sufficient to kill it.

So far as known, the beetle attacks only spruce. The most striking and important feature is its habit of attacking only the larger trees. It is rarely found in trees below ten inches in diameter. A study of the living trees which had recovered from a slight attack, as well as those that were infested by different stages of the insect, indicated quite clearly that the first entrances are made in the bark of a healthy tree at a point from six to ten feet from the base.

The entrance gallery is started probably by the male beetle, and gradually extended upward or to one side through the inner bark. The male is then joined by a female, and together they excavate a broad gallery, often grooving the surface of the wood for a distance of six to twelve inches. Along the side of this gallery the eggs are placed singly in small cavities, protected by a mass of borings cemented with gum. After all is finished the adults may go on to irregular borings at the further end, apparently for an abiding-place before they die.

The leaves of a dying tree infested by this insect change from a dark, healthy green to a pale or gray hue, and soon fall. Infested trees present by their reddish appearance a striking contrast with the healthy foliage, and are thus easily recognized.

Three practical methods for mitigating the ravages of the spruce-destroying beetle and reducing future losses to the vast amount of timber have been determined on, as follows: First, to regulate the winter logging operations, so that as many of the dying and infested trees as possible can be cut, and the logs therefrom placed in rivers, ponds and lakes, between October 1 and June 1. Vast numbers of insects will thereby be drowned, or so far removed from the large standing spruce that they can do no harm; second, to regulate the summer operations so that as many of the infected trees as possible can be cut while the bark will peel; third, to girdle healthy trees in June to attract the beetles away from timber that it is desired to protect. The use of girdle-tapped trees has the advantage of not only facilitating the destruction of the insects, but of luring them away from the matured timber that it is desired to leave standing.

The approximate amount of spruce standing in the State of Maine at present is 25,000,000,000 feet, board measure. Some idea of the damage wrought by the spruce-destroying beetle can be gathered from the official report of Dr. Hopkins, in which he states that from 50 to 90 per cent. of the matured spruce timber has been killed over large areas by this pest.

The Census Bureau at Washington has issued a preliminary report on saw and planing mills and timber camps. The total capital thus invested in the United States is given as $611,611,524, and the value of the product $586,832,984. Pennsylvania stands third on the list (being only preceded by Michigan and Minnesota), with an investment of $47,832,548, and an annual value of product of $35,749,905.

Forests and Floods in the Alleghany Mountains.

—

SEVERE floods have visited the South in the course of the past winter. Daily and weekly papers ascribe, editorially, the cause of such floods to the reckless manner in which our mountain forests are destroyed by the lumberman's greediness, and tree preservation is generally advocated as the only preventive to future and increased losses arising from sudden inundations.

In the mountain section near Asheville, with which I am familiar, floods have occurred previous to the arrival of any lumberman. In the waters of the French Broad River the heaviest flood on record, the memory of which is alive with the older generation of mountaineers, occurred in June, 1876, at a time at which not a tree had been touched at the headwaters of the river. The flood, it is said, followed in the train of prolonged rains. No freshet, since lumbering began in the mountain section, has swelled the river to the level attained in 1876, as is clearly indicated by the gauge-marks then made by the terror stricken settlers along the river's course.

The fact that the heaviest freshet on record was a summer freshet is astonishing, since trees clad in heavy foliage are thought to form better receptacles for rain than the leafless forest of the winter.

On December 12, 1901, I narrowly escaped death by drowning in a mountain stream usually six inches, then six feet, deep—a stream which rises in an inaccessible valley never touched by the lumberman, forming part of Mr. Vanderbilt's mountain estate. Apparently, forest preservation cannot save us from freshets; freshets will occur as long as local cloudbursts cannot be averted.

The trees themselves, anyhow, cannot act as receptacles for huge amounts of water. True, the wood of a tree contains about 45 per cent. of water. Thus, an acre of forest land will show, on an average, 1500 cubic feet of water stored away in the trees. This, however, is always on hand; severe drought and excessive rain cause but slight fluctuations—during the leafless season, practically none.

But let us go a step further: A rainfall of six inches covers, so to say, every acre of ground with a shallow pond containing 21,780 cubic feet of water. Is it not ridiculous to assume that trees are able to absorb a noticeable fraction of that figure? The lumberman, when cutting and removing scattered trees, without a doubt, interferes but slightly with the water-retaining power of the forest.

The water-retaining power of the forest lies in the vegetable mould, the dead leaves and *débris* covering the ground underneath the trees. The hygroscopicity of this natural carpet is astounding, as the experiment easily proves: through heavy rains, the weight of the litter on the ground is increased by from 500 to 1200 per cent. Here it is, then, that we have to look for the forestal reservoir capable of retaining huge quantities of precipitated water.

In the forest, underneath the vegetable ground floor, is found a soil of high porosity, a porosity created by plant and animal life within the soil, under the fostering care of the humus covering it. This porosity allows the precipitations caught by the ground floor to gradually penetrate into the lower strata of subsoil, filling every crack and crevice, pressing slowly downward towards the springs.

On a mountain slope covered with a litter of vegetable mould, the rain-water is prevented from running off superficially. Rapid surface drainage, as we find it on agricultural land, is converted into slow underground drainage. Again, in the litter on the ground, not in the trees, lies the water-regulating character of a forest.

As long as the ground floor lies undisturbed, the waters emanating from a forest are clear and free from mud, even in a severe freshet. We underestimate, without a doubt, the increase of "momentum" added, by the admixture and suspension of particles of soil, to the power of a swollen stream. A simple experiment can teach a good lesson: Take a glass of clear water, and find how many spoonfuls of dirt you can dissolve in it, keeping the water well stirred. Further, ascertain the increase in volume and weight obtained through the admixture. Surprised at the result, you will recollect that the most disastrous floods are those made up by muddy water.

Cloudbursts with us, in the Appalachian regions, are rather a rare occurrence. If you want to see and feel heavy precipitations, you must go to Brazil, or to the coast range of Washington. There the rainfall is three to five times as heavy as it is with us, and you wonder why the very mountains are not washed away. The litter on the ground, again, solves the puzzle. Abundant rainfall invites luxurious vegetation; luxurious vegetation creates a vegetable ground floor measuring several feet in thickness, and amply able to cope with superabundant precipitations.

If we want to decrease the losses from freshets and inundations, let us increase and maintain the litter at the feet of the trees, let us husband the *débris* left by the lumberman or by primeval nature!

This ground carpet, however, is continuously destroyed by the mountaineer, the hunter, the herder, the camper, the moonshiner. The force used is even less controllable than water: it is the fire. The forest litter forms the battleground of the two most powerful forces at our command: of water and of fire. Men yield the victory to either fire or water. Unfortunately, for the last 100 years conditions were in favor of fire. As lasting signs of its victory, the old trees show, above the roots, scars and wounds inflicted by the fierce heat of the flame.

If we want to avoid waters, let us avoid fires!

Few of our streams have sources and mouths within the limits of one and the same State. Hence the problem of water regulation, or, which is the same, of forest fires, is an interstate problem, a problem remote from State influence, and soluble only by federal action.

Congress, through Article I., Section 8, of the Constitution, has power "to provide for the general welfare of the United States," a welfare largely dependent on proper regulation of waters and streams. All the Appalachian States have, on their statute-books, adequate laws meant to prevent the firing of woods. None, however, is particularly interested in enforcing such laws within her own boundaries,—whilst the neighboring States, in many a case, are distinctly involved. It would not be a difficult nor a very expensive problem to increase the federal staff of country police, and to employ it in enforcing the laws and in preventing forest fires for the benefit of the thousands of industries depending on a regulated stream flow.

The proposed creation of a federal forest reserve in the Southern Appalachians, aggregating 2,000,000 acres, must be viewed with delight by all friends of the forest. This tract, certainly, will be saved from conflagrations. Still, what is 2,000,000 acres of forest for the South, the mountains of which, at the headwaters of the rivers, cover about 40,000,000 acres? Will the reservation of a small fraction have any effect on the river gauges? At an annual expense of $300,000,—a sum much smaller than the annual losses caused by inundations,—the federal government can entirely suppress forest fires, and greatly diminish the severity and frequency of floods. Uncle Sam spends thousands of dollars for the benefit of the Western forests. Is there nothing left for the East? Can federal money be used for a worthier purpose than the preservation of the Appalachian forest?

C. A. SCHENCK, PH.D.

(Printed in *Dixie* of April 1st, an advanced copy being furnished by the writer.)

Correspondence.

—

Editor FOREST LEAVES:

Dear Sir: I wish to write you a few lines respecting the advance "scientific forestry" is making in Luzerne County, Pennsylvania.

Since Pennsylvania has been the pioneer State in all forestry matters, and since such a good foundation for its true appreciation and adoption has been laid, it is not to be wondered at that "scientific forestry" has been taken up seriously and introduced successfully by a number of public-spirited citizens of a certain section of Luzerne County, who have taken it upon themselves to re-establish the once valuable forests which human hands so wantonly destroyed.

Where once the noble white pines, hemlocks, chestnuts, oaks and hickories rivalled with each other, we find to-day nothing but a veritable jungle, composed of dead, dying and deceased material, not even fit for the fireplace. Follow the Lehigh River along its course on either side, and over the greater portion of the adjoining counties, we find evidences of man's ignorance and neglect, his violation of nature's laws in expecting it to produce a second crop of valuable timber, after the virgin one had been removed in a wasteful manner, without even assisting her in reproduction.

With fires sweeping over this territory every spring and fall, killing every young seedling, destroying little by little the once rich layer of humus soil, blistering and cracking the bark of older trees, and thus preparing a suitable seedbed or better breeding-place for billions and billions of forest-destroying insects and fungi, what else can we expect but the most appalling forest conditions imaginable?

With rapid strides that octopus amongst Nature's children, "scrub oak," *Quercus Ilicifolia*, the worst enemy of the forester, has stolen a march by installing itself in such vast numbers that thousands of acres are covered with it, preventing the growth of more valuable trees.

While these prevailing conditions are bad enough along the uplands and bottoms, they become more apparent along the sides of the mountains.

Here the rich humus soil, originally held together by the root-systems of the virgin trees, followed the latter's disappearance. Exposed to a blistering sun, charred and baked by ravaging fires, wind and rain, singly and combined, have long since borne and washed away the natural seedbed of such great importance in the reproduction of a valuable crop of timber.

In spite of all these discouraging forest condi-

tions, the residents of that beautiful summer colony, "Glen Summit," have undertaken to overcome these obstacles by the introduction of "scientific forestry."

I do not deny that, when standing on top of "Reservoir Mountain," surveying that grand panorama stretched out before me, and comparing it mentally with what it could and should be—with the scrub oak so thick at my feet that one hardly can walk through it, with thousands of charred tree trunks in every direction pointing appealingly heavenward,—a sigh escaped my lips, a feeling of contempt stole into my heart against those who so ruthlessly have destroyed Nature's beautiful and valuable garment. Yet the greater the difculties to be overcome in the life of the forester—unaffected by discouragements and disappointments of every sort—the greater the persistency of endeavor will be, and, finally, the sweeter the fruits of labor.

Individual private exertion—"Private Forestry"—will be the keynote of future successful forestry in our country, notwithstanding the fact that Government (National) agents are trying their best to educate our citizens in the belief that "forestry" is solely a Government institution, and that its success rests entirely in the management of *private forests* by the former.

This is a direct insult to the intelligence of our citizens. If such management of private forests by Government agents could be honestly and conscientiously carried out, it would mean the eventual turning over to the latter of every foot of woodland owned by private citizens. It is something which, on its face, is a matter of impossibility and un-American; it is the same as if every unpractised farmer would put his farm under Government supervision, and ask some politician to come along, plant his potatoes and raise his corn for him.

Those who have already lent a willing ear to such solicitations, ignorant of what scientific forestry means, will sooner or later find out the danger of such a course to their own sorrow and pecuniary loss.

Pennsylvania's citizens, standard-bearers of true forestry, are too intelligent, as a whole, to be drawn into the meshes of such solicitations.

In this instance, the problem of introducing forestry into their timber land will be solved by individual private exertion, and I dare prophesy in advance that these public-spirited efforts will ultimately be crowned with entire success.

The work entails considerable expense, a conscientious and careful study of the existing conditions, and the finding of lasting remedies for their improvement.

After subjecting a large number of trial acres to a careful scrutiny, there were found representatives of every known forest-destroying insect and fungi known to the scientific forester, and constant care and attention is necessary to bring "reforestration" to a successful issue.

In addition to the innumerable dangerous insects found, a great many of which were so ably described in the annual reports of *Dep. of Forestry, Penna.*, there were discovered by mere accident representatives of "*Lophyrus pinii*" (L.), "*Lyda hypotrophica*" (Htg.), and also "*Lyda pratensis*" (Fabr.) (*Stellata Christ*). These were found in almost every instance in "imported" nursery stock, such as Scotch pine, Norway spruce and Weymouth pine, and it is desired to call particular attention to these insects, on account of the destruction they are capable of executing, particularly amongst young pine.

With the preliminary investigations "Improvement" cuttings, trimmings and thinnings were begun on various tracts, and planting plans prepared for this spring's work. The methods to be employed in the plantings, for which the preparatory work has already been finished in part, vary from common "place planting," as in a "selection forest," to "replanting in belts," in regular, or irregular quadrangular and triangular form, according to the natural conditions of the ground, species of trees, and their silvicultural requirements, etc.

There will be planted, this spring, from ten to twenty thousand trees, of which the white pine takes the lead, being followed by Norway spruce, Austrian pine, and a large assortment of deciduous trees particularly adapted for this locality, of which "*Fagus silvatica*," the European beech, has been given the preference to the American beech, on account of its superiority in quantity and quality of wood production.

This certainly is an excellent beginning of what promises to be an important enterprise in American forestry.

Very sincerely yours,
F. VON HOFFMANN.

The wood of old trees is usually poorer in ash than that of young trees. For example, the wood of a beech tree 20 years old contained 0.46 per cent. of ash, and that of one 40 years old 0.45 per cent.; one 50 years old 0.36 per cent., and one 220 years old 0.37 per cent. An oak tree 15 years old contained 0.53 per cent. of ash; one 25 years old 0.41 per cent.; one 50 years old 0.22 per cent., and one 345 years old 0.22 per cent. —Weber, in Wolff's *Aschen Analysen*.

To Cut New York State Forests.

THE Senate body of the State Legislature, at Albany, on March 11th, passed the Brown amendment to the State Constitution, which provides that the Legislature may authorize the sale and removal of hemlock, pine, spruce, balsam and other soft woods, if more than ten inches in diameter, three feet from the ground, on the forest preserves of the State. The revenue which the State will derive from cutting this matured timber, it is believed, will add many thousand dollars to the State Treasury, and the amendment as passed nullifies the provision in the Constitution of 1895, which prohibited the cutting of timber on State Forest lands.

The Executive Committee of Pennsylvania State Grange, at its recent meeting at Harrisburg, made a statement, one paragraph of which will be of interest to our readers:

"The severity of the recent freshets and the immense damage done thereby call forcibly to mind the needs for the preservation of our forests, and we recommend that farmers and others plant forest seeds and trees on hillsides and rough and waste lands, which in time would hold the snows and rains from sudden flow, and prevent soil from being washed away. In this connection we desire to commend the good work done by our Forestry Commissioner, Dr. J. T. Rothrock. And we would urge upon people generally greater care and assistance in preventing forest fires."

A letter received from a gentleman of the northern part of Pennsylvania who is famous for the quality of maple syrup which he makes, states that it is so hard to obtain help now in this work that he has not yet been able to get his maple trees tapped this spring.

This is unfortunate, when one considers the ready market which exists for maple sugar and syrup. Maple wood will always be valuable, and it is fairly a question whether we have ever properly estimated the value of a tree which is probably the commonest tree in the State, and is valuable both for its lumber and its sugar.

May it not be possible that, some time, culture of the sugar maple tree will become a special industry in Pennsylvania? J. T. R.

The House Committee on Public Lands has ordered a favorable report on the bill to acquire the giant tree tract of California. The Secretary of the Interior is authorized to purchase it for $200,000, or to resort to condemnation proceedings.

New Publications.

Bulletin No. 1. Indiana State Board of Forestry. On March 1, 1901, there was established by law a State Board of Forestry in Indiana. The law is not quite as comprehensive as that of Pennsylvania, establishing a Department of Forestry, which went into effect but a few days earlier, but the duties set forth are not far different. "It shall be the duty of said board to collect, digest and classify information respecting forests, timber lands, forest preservation and timber culture, and to recommend plans and methods for the establishment of State forest reserves."

This bulletin "merely introduces the subject of forestry to the Commonwealth of Indiana," but in such a manner that the people must recognize the need of a State forest policy. This necessity is clearly and forcefully stated in consideration of the relation of the forests to the industries of the State, to agriculture, to fruit growing, to flow of streams, and to climate. A few hints and instructions relative to the propagation of suitable trees and to timber culture are also given. G. H. W.

Fifth Annual Report of the Commissioners of Fisheries, Game and Forests of the State of New York. Small quarto, 466 pages. Bound in cloth. Illustrated. Published by the State Printer, Albany, N. Y.

This volume contains the financial statement for the year 1899, the reports of the Shellfish Commissioner, the Superintendent of the Fish Hatcheries, the Chief Fish and Game Protector, the Superintendent of Forests, as well as a number of articles by specialists. Our readers will be interested in the report of the Superintendent of Forests, Mr. William F. Fox, in which he calls special attention to forest fires, and the necessity of enforcing the laws in regard to them. Mr. Fox also contributes two articles, one entitled "Timber Product of the Adirondacks," the other "Forest Fires in 1899." He gives the total consumption of saw and pulp mills in 1899, not including pulp wood from Canada, as 447,747,247 feet, of which 195,568,623 feet was pulp wood, and the balance saw logs. This was a decrease of nearly 100,000,000 feet from the amount used in 1898. He estimates that the spruce wood is being cut at the rate of over 80,000 acres per annum. Dr. E. P. Felt, State Entomologist, has an interesting paper on "Insects Injurious to Elm Trees," describing the elm leaf beetle, the bag or basket worm, the fall web worm, the spiny elm caterpillar, the elm borer, and the elm-bark louse, together with valuable suggestions for controlling

insect pests. Dr. John Gifford describes "Some European Forest Scenes," while Dr. C. A. Schenck writes on "Forest Taxation," and Dr. B. E. Fernow has an article on the "Beginnings of Professional Forestry in the Adirondacks." The book is well and profusely illustrated (some of the plates being colored), and contains much valuable information.

Seventh Annual Report of the Forest, Fish and Game Commission of New York. 8mo, 93 pages. Bound in paper. Albany, N. Y.

The report shows that at the close of the year 1901 the State of New York owned a total of 1,408,181 acres of timber land, of which 1,325,851 acres were in the Adirondack preserve, and 82,330 acres are in the Catskill preserve. Of the 1,325,851 acres mentioned above, 1,163,414 acres are in the Adirondack Park. During the year an investigation was made as to the merchantable timber in the Adirondack Park (estimated to cover 3,226,144 acres), and it was found that 1,158,054 acres were in forest, 1,671,139 acres lumbered, 48,551 acres waste, 43,165 acres burned, 56,682 acres denuded, 22,529 acres of wild meadows, 100,980 acres improved, and 125,014 acres of water.

During the year 1900 there was obtained from the forests in Northern New York a total of 622,913,622 feet, B. M., of timber, of which 397,264,148 feet were spruce.

The Chief Fire Warden's report is a gratifying one, showing that, although there were numerous forest fires, the total damage amounted to but $3,980.

During the year there was added to the Adirondack Park 36,458 acres, and to the Catskill Park 5,605 acres. The effort now being made to reforest some of the denuded mountain slopes in the Catskills is also described, while the reports of the Chief Game Protector, General Foreman of Hatcheries, and Superintendent of Shell Fisheries, are also given. The pamphlet is well illustrated with numerous plates.

Part V. of the Twenty-First Annual Report of the U. S. Geological Survey.—Forest Reserves. Extracts from this report dealing with the Olympic Forest Reserve of Washington, the Stanislaus and Lake Tahoe Forest Reserves and the Adjacent Territory, the Classification of Lands, and the Woodland of Indian Territory, also the accompanying maps, have been received. Numerous illustrations add to the interest of the descriptions of these western Reserves. The descriptions and data are based upon very careful and extended examinations of the country with which they deal. They discuss the topographical features, the water supply, settlements, industries, and questions relating to the forest and its growth. For the future management of the Reserves these reports are of inestimable value. G. H. W.

Fourth Annual Report of the Director of the New York State College of Forestry, 1901. This report shows the number of students now on the roll to be 35. The operations in the College Forest at Axton were hampered by the cutting down of the appropriation from $50,000 to $30,000. During the year 2,500,000 feet of logs and 8000 cords of wood were secured, 1.4 miles of railroad constructed, the nurseries kept up, and 160 acres planted. The system of forest management is outlined. The tree planting was more expensive, amounting to $6.40 per thousand in the ground, against $4.85 in 1900. The financial statement of the forest shows an unexpended balance of $5.290.20. The most pressing need of the college is a satisfactory house for the students. The report closes with the text of the Act establishing the college.

The Yale Forest School has issued a catalogue for 1901–02, showing 31 scholars on its roll, not including the attendance at the summer school, which in 1901 would have added 27 more to the list. Instruction is given in botany, geology, zoology, engineering, introduction to forestry, silviculture, forest measurements, State and National forestry, forest management, forest technology, lumbering, forest protection, history of forestry, forest administration and law, and forest administration abroad. Excursions and field work are given in several tracts of woodland near New Haven. The second year men spend three weeks in the lumber woods, and also the whole of the spring term in the field, a portion of the time at Milford, Pa., the balance as may be selected by the faculty. The fall term of 1902 begins September 25th.

In the trunks of the large eighteen-inch trees opposite the Y. M. C. A., lately cut down, were found embedded iron tree boxes, around which the trees had grown, covering the boxes to a depth of four or five inches. The boxes were put in place many years ago by the late Ziba Bennett, in front of his residence.—*Wilkes-Barre Record.*

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Law, Hon. W. N. Ashman, Chairman; Henry Budd, Charles Hewett, Henry C. McCormick, and John A. Siner.
Publication, John Birkinbine, Chairman; F. L. Bitler, Alfred Paschall, and Harrison Souder.
Work, Mrs. Brinton Coxe, Chairman; Mrs. George T. Heston, Miss E. L. Lundy, Mrs. John P. Lundy, Howard M. Jenkins, William S. Kirk, and Abraham S. Schropp.
County Organization, Samuel Marshall, Chairman; Eugene Ellicott, James C. Haydon, Dr. J. Newton Hunsberger, and Richard Wood.

OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

IT seems a reflection upon the intelligence of the people of the United States that every spring, as soon as the warm sun dries the fallen leaves, the public press must be filled with records of forest fires doing great damage in the destruction not only of standing timber, but of homes and other improvements; and this year we have to chronicle the loss of life.

In the last issue of FOREST LEAVES we referred to the damage done by the sleet storm. This was not preventable; but the results of the damage can be ameliorated by care in the protection of broken branches or limbs. Fires are, to a very great extent, preventable, and the damage done by them cannot, in most cases, be remedied. There are occasional instances where fire is not preventable, but these are the exception, and merely go to prove the rule that the damage could be very greatly reduced by care and by rigid enforcement of existing laws.

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We are informed that the bill authorizing the creation of the Appalachian Forest Reserves now being considered by the U. S. Senate and House of Representatives seems to be in good shape, but it is uncertain whether the measure will be passed at this session of Congress.

* * * * *

In the March term of court in Pike County, suit was brought by the State against Hiram Miller and Jerry Labar for cutting timber on State lands.

The parties were not tried; the District Attorney was allowed to enter a *nolle prosequi* on payment of costs and a penalty of seventy-five dollars by the defendants. Mr. Miller also gave written agreement to keep off of, and to protect, so far as possible, State lands for a period of two years. It was also agreed that, if he failed in any part of

this understanding, other suits would be brought against him.

Altogether, the failure to recognize which side of the line the defendants were on cost them about one hundred and seventy dollars.

Just a few more such examples will effectually protect State lands against lawless, intentional trespass.

* * * * *

A recent decision by Judge Dunham, of Wyoming County, in the case of George Gunder *vs.* Wyoming County, to secure payment for services rendered in the suppression of forest fires, under the Act of March 30, 1897, P. L. 9, sustains the constitutionality of the Act in the following language :

"In view of all the decisions, and the reasons upon which they are founded, we are unable to find any sufficient reason for declaring the Act of March 30, 1897, P. L. 9, unconstitutional, and therefore find in favor of the plaintiff, and render judgment in favor of the plaintiff and against the defendant for the sum of $11.90, with costs."

We hope to have a full account of Judge Dunham's opinion in the August issue.

* * * * *

We regret to chronicle the death of the Hon. J. Sterling Morton on April 27, 1902. Mr. Morton was one of the foremost advocates of scientific forestry, and the "Father of Arbor Day," which is now recognized in forty-four States. He was Secretary of Agriculture at the time President Cleveland created over one-third of the present national forest reserves, and was a strong advocate of their establishment. Living in the prairie State of Nebraska, where but few trees were found, and appreciating the value of trees to the agriculturist, he was enthusiastic on the subject of tree-planting, and in 1872 proposed to the State Board of Agriculture the setting apart of a special day (April 10th) for this purpose, to be called Arbor Day. Public attention was aroused, and it is said that more than a million trees were planted on this first Arbor Day. So successful was the experiment that the Governors each year followed this example, and in 1885 the Legislature passed an act designating April 22d in each year Arbor Day, and making it a legal holiday.

* * * * *

The following is quoted from a letter just received :

"The two parties indicted under Act of 1879, in Union County, for setting fire to the woods, pleaded guilty and asked for the mercy of the court. They were sentenced to pay a fine of fifty dollars each and costs of prosecution, or stand committed. They complied with the sentence."

It is pleasant to note the fact that each year the fire laws are being more vigorously enforced, and that it is now comparatively easy to secure a verdict against those who have started forest fires. If our county officers over the State would all act as vigorously as those of Union County have in this matter, it would not be long until forest fires would become very rare.

Arbor Day at Haverford College.

THROUGH the courtesy of the President and Board of Managers, the Pennsylvania Forestry Association held its Arbor Day exercises at Haverford College on Friday, April 4th, at 4 P.M. The members gathered in Alumni Hall, where Dr. Isaac Sharpless, President of the College, welcomed the Association. He spoke of one of the members of the original Board of Trustees who had spent quite a large amount of money some 70 years ago in planting trees, and his associates reproved him for the expenditure, which resulted in the beautiful trees now standing on the lawn.

After speaking on the waste of forests in Pennsylvania, resulting in barren lands, with tremendous losses from droughts and floods, expressing pleasure that Dr. J. T. Rothrock and Governor Wm. A. Stone were now taking care of some of the lands with the intention of preserving them as timber lands, he introduced Mr. John Birkinbine, President of the Pennsylvania Forestry Association, who presided over the meeting.

Mr. Birkinbine stated that when the proposition was made to hold the Arbor Day meeting at Haverford College it met with universal approval, and the Association appreciated the kind welcome given them. The late sleet storm, which Dr. Sharpless mentioned as damaging trees on the lawn, was quite disastrous to timber, but it may, he thought, awaken interest in the preservation and protection of trees. Two days were set for Arbor Day, April 4th and 18th, owing to the difference in climatic and topographic conditions of various portions of the State, and in this section the earlier one was generally observed.

Mr. Richard Wood, Vice-President of the Pennsylvania Forestry Association, and one of the Board of Managers of Haverford College, was introduced and read the Arbor Day Proclamation.

Mr. John Birkinbine, President of the Pennsylvania Forestry Association, made an address, which will be found on another page.

Hon. William M. Ashman stated that the President had, in a candid way, asked him to make a few feeble and brief remarks, with emphasis on "brief," and he would endeavor to carry this out. Personally, he had no pecuniary interest in forests, for while he had several acres of land there was but one large tree on it, and even that had enemies, who asked, "Why cumbereth it the ground?" This particular tree had shaded some town lots which were used as vegetable gardens, and he was accused of contributory negligence for allowing the tree to stand and cast a shadow. A compromise was finally made whereby the tree was allowed to stand, and a part of his own ground was to be used in place of that which was shaded.

The best way to judge of the influence of the Association was by contrast. In his school days they did not take much thought of trees, outside of the fact that they were available for shade. Since then great advances have been made, the chief help being the monetary value of the forests, which led to the efforts to stop the devastation of timber lands and reforesting of cut-over lands. A number of years ago he was shown a large tree, and was told that if it had been near a railroad it would have been worth $300, whereas where it stood it was then worth nothing, as it would cost too much to get it out. Thus the lumberman looks at the pecuniary value, and through this they can be induced to aid reforesting, to preserve the industry.

A philanthropist wished to see a deeper channel to the sea, and started on a crusade up the State, where he explained the great objects of a deeper channel—that the destruction of the forests lead to the deterioration of the rivers, filling the channels, etc. But he took the wrong course. The people said that these trees were their means of livelihood, and turned a deaf ear to his remarks. Then the same man undertook to assist in the amelioration of the poor by advocating intense gardening, where a few hours' work would bring large returns, forgetting that intense gardening requires a considerable expense, great skill, etc. The ultimate benefit of the Forestry Association goes beyond the question of wealth, and enters into public health. The æsthetic side is also important, and closely connected with the study of horticulture. That the work carried on by the Association was valuable was shown by the fact that the total value of the product of the planing-mills and lumber-camps of Pennsylvania in the census year 1900 amounted to a total of $35,000,000, and, while preserving this valuable industry, was also educating the people on lines which will add immensely to the joy and well-being of its citizens.

Dr. Francis B. Gummere, of Haverford College, then read a poem.

Prof. Albert S. Bolles, of Haverford College, said that while walking along the road with a companion, he noticed that he was carefully examining two noble elms, which he was no doubt admiring for their size and beauty, but was astonished when he remarked that he thought the trees would make four cords of wood ; and this practical way of looking at things had taken shape until there was little timber left. In Juniata County he had seen a virgin forest which was commencing to decay, and should be cut, as it was no use to keep it any longer. When in the Yellowstone Park he saw great stretches of valuable timber which had been carelessly burnt by the U. S. cavalry sent to protect the property.

The advice of the founder of the colony of Pennsylvania that one-sixth of it be kept in timber had not been heeded. Even before the Revolution, people noticed the shrinkage of the streams due to the denuding of the forests. In the reign of Edward III. of England, that monarch had the same feeling in regard to the cutting off of the timber, and took active measures for reforestration. To this forethought is due the fact that England now has more forests than it had six centuries ago. Italy feels the lack of water and the need of reforestration. In Rome, once a year the children plant trees—the larger ones young saplings, and the smaller, seeds. Four thousand were planted at one time. He was glad to see that the necessity of reforestration was being universally recognized.

President Sharpless announced that the ladies had prepared an entertainment in the gymnasium. The meeting then witnessed the planting of trees on the lawn, the Messrs. Wood having courteously contributed 14 evergreens and 6 elms. After light refreshments and social intercourse the meeting closed with a vote of thanks to President Sharpless and the Board of Managers.

Reports from Washington, D. C., state that "seventeen-year locusts" have appeared in the Smithsonian grounds, covering the lower branches of two large trees. Altoona, Pa., and Nashville, Tenn., have also reported to the Agricultural Department that they also have found locusts on park trees.

Scientists of the Agricultural Department say that within a few weeks locusts will appear in Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Ohio, Indiana, Illinois, Michigan, Wisconsin, the District of Columbia, and possibly in other localities.

Address at Haverford College by President John Birkinbine.

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IN rambling through woodlands, we occasionally see large rocks or boulders grasped by tree-roots which fill and swell beyond crevices, and in many cases the rocks are rent by the growth of the root. Tracing the history of such a tree, we would probably find that a seed or a nut blown from a neighboring tree, or dropped by squirrel or bird, took root in the sparse soil covering a depression in the rock, and little rootlets, seeking for water, followed crevices in the rock, in time filling these, and, as the tree grew larger, fracturing the hard stone. It is not uncommon to find a tree of considerable size growing on apparently barren rock, and an examination will generally show that portions of these rocks have been broken by the constantly increasing pressure of the root growth.

While the Pennsylvania Forestry Association does not claim to be fully symbolized by such a description, its earlier life may be considered as approximating that of the tree resulting from the nut or seed indicated. Sixteen years ago, when the Association was organized, those who took active parts as its sponsors were considered enthusiasts, or, to use a more popular term, "cranks." Our best friends admitted that the movement was well-meaning, but asserted that it was impracticable. There seemed to be nothing to sustain or encourage its growth; and the Association apparently started in barren soil, or where there was so little to nourish it that it was considered to have but a short prospective life. The general absence of interest in forest protection, the feeling that there were plenty of trees, and the almost universal conception that the country was too young and too rich in resources to copy older European forestal methods, formed the hard and apparently unyielding rock upon which the few friends of forestry planted the seed. Although it is not claimed that our plant has reached full maturity or grown to be of great size, it may be fairly considered a strong and healthy sapling, with prospects for the future certainly encouraging. Progress was at times slow, but the effort has been persistent. Little by little ground has been gained, and we see to day many instances where the appeals for support have met with favorable response.

Through our organ, FOREST LEAVES, by means of public meetings, by appeals to tree lovers, by Arbor Day celebrations, and by the potent aid of the press, interest in forest protection has been awakened, and Pennsylvania now ranks first in numerical strength of a forestry organization and second among the States which have secured extensive forest reserves.

The subject of forest protection for Pennsylvania was ably discussed by a commission, the appointment of which resulted from the efforts of the Pennsylvania Forestry Association, and the Forestry Department is now an established feature of the State Government, recognized as such, and doing good work through its reports and the active investigations of the Forestry Commissioner. Four hundred thousand acres (625 square miles), which now represents the forest reserves owned by the State, is certainly an indication that the community has been awakened to the importance and necessity of forest protection. But four hundred thousand acres is but $1\frac{1}{6}$ per cent. of the area of this great State, and represents but a modicum of the area which is practically waste, and which can sustain forests better than agricultural products. Commissioner Rothrock has stated that one-sixth of the area of the State can be applied to forests with more advantage than to agriculture. It is remarkable that William Penn is credited with a similar statement over two centuries ago, when so much of the territory was practically unknown. Our forest reserves could therefore be increased twelvefold without exhausting the practical possibilities of the State. One of the objects of the Pennsylvania Forestry Association is to secure the reclamation of waste lands by having them reforested, and encourage the protection from destruction of existing forests. We need these woodlands for future timber supply, for the conservation of water, and for the health and enjoyment of our people.

Whatever has been accomplished has been by persistent efforts, keeping a single purpose in view, and by maintaining the Association free from partisan or political entanglements—a course which has drawn to its aid the better element of the State, and gained the friendship of many in official position whose political views are greatly at variance.

It is the desire and hope of friends of forestry to remove from any political significance the efforts to protect our remaining wooded areas and to propagate others. It is a public service which should be rendered for the public good.

In the interval covered by the life of the Pennsylvania Forestry Association, the forests have also received attention from the National Government and from that of other States.

The United States now has forest reservations in eleven States and Territories, aggregating forty-six and one-half million acres, or seventy-two thousand square miles. New York has magnificent

reserves, principally in the Adirondack and Catskill Mountains, amounting to one and one-half million acres, or twenty-three hundred square miles.

The administration of the large waste areas held as reserves by the National Government and in various States and Territories, or by some of the States, will demand constant care and watchfulness, for the purpose of reservation is not merely to maintain the forests, but to make them useful. True forestry is not antagonistic to legitimate lumbering interests, but it seeks to preserve the standing timber from useless waste and destruction.

Forestry schools have been established, and courses in forestry education are features in some of our universities. In the near future, many young men who have received collegiate education may be expected to seek attractive and healthful employment in the specialty new to this country, Scientific Forestry—a specialty which will enthuse a love of nature, and encourage the acquisition of practical and technical information; for a good forest expert will need to have knowledge of botany and soil conditions. He will meet problems which affect the commercial utilization of forest products, and others which demand engineering experience.

One of the advances which is to be credited to the popular appreciation of forestry has been in securing laws to protect our woodlands against wholesale destruction from fire, and in having these laws enforced. Many of the forests of this State, and also of other States, have been swept by fires which have damaged or ruined immense areas of growing timber whose money value is enormous; and he who, from vandalism, vengeance, self-interest, or carelessness, started these conflagrations, was seldom apprehended or punished. Public sentiment, aroused to an appreciation of forest value and of fire damages, resulted in securing protective legislation, and this sentiment supports officials in enforcing the penalties provided.

During the past winter Eastern Pennsylvania suffered severely from storms, and vast numbers of trees have been damaged, and some of them ruined, by the limbs, and in some instances the trunks, being broken by heavy loads of sleet. It will be many years before the symmetry of the trees so damaged will be restored, and in a number of cases this will never result, for either the damage was too great, or want of care in protecting the fractured portions will cause the tree to rot and decay. But as we appreciate by ocular demonstration the extent of this injury, we may realize that many fires in this State have each done as much damage to timber as the sleet referred to caused in the section with which we are familiar.

One of the chief values of forest reservations will be in the conservation of water, either for water supply or for power. It is not claimed that forests increase the rainfall, but that the protection given by the leaves and the porous character of the forest floor are material influences in retarding the run-off from a given area, and in equalizing the stream flow. Hence, with liberal portions of the higher water-sheds of streams practically covered, especially where the topography is abrupt, the storm-waters are held in check, and the risks from extreme freshet or severe drought are reduced. An even more important function than reduced damage done by freshet is that the water held in the forest floor and conveyed to the underground courses encourages a larger minimum and more uniform normal flow of streams, making a stream of a given area more valuable for purposes where the power is to be utilized, or where the impounding of the stream-flow is necessary for water supply, etc.

With the rapid advance in developing electrical energy, and the conveyance of this to industries, each stream having a liberal drainage area and an available fall offers a possible factor for industrial development, and the uniformity of the flow from a given drainage area is, therefore, a very important factor in securing economical installations which will advance the public welfare.

Forestry, therefore, is not a fad, nor merely a notion. While the æsthetic and sanitary effects of the forests are undoubted, and are certainly worthy of attention, there are other reasons of a commercial or business character which entitle the forests to the interest of the people of the State.

And these Arbor Days, which have now been a feature of the State administration for more than a decade, have their purpose in semi-annually calling the attention of the public to our forests, and to the value of trees.

Tree-planting, as encouraged by the proclamation of the Governor, may not be considered as true forestry, because, as a rule, individual trees, or small groups of trees, are planted; but in each tree-planting one person, and often a number of persons, are interested in a particular tree or group of trees, and that interest continues for years, those participating watching the growth, and recalling the circumstances connected with the planting. This, in itself, has a beneficial influence by directing attention from the individual trees to the forests as collections of tree growth, and awakens in the public mind an appreciation of one of Nature's best gifts to man.

It is, therefore, proper that we should celebrate

these occasions, and in no way can future forests be better insured than by having the participation of educational institutions in Arbor Day exercises, whereby those who are planning to enter active business life will be impressed with the importance of caring for the remnants of our existing forests and propagating new growths. And what better place than Haverford College could be selected for celebrating Arbor Day, where the students have the benefit of grand old trees of varied families as constant reminders.

Arbor Day in Pennsylvania.

ON April 4th, the first of the Arbor Days appointed by the Governor, the Pennsylvania Forestry Association, at the invitation of the Board of Managers, held its Arbor Day exercises at Haverford College, an account of which will be found in this issue.

Owing to the lateness of the season, the second Arbor day, April 18th, was usually selected, while a few chose April 25th.

In Philadelphia, Superintendent Brooks issued a circular to the principals of the public schools recommending that suitable exercises be held on Arbor Day, and said: "These exercises should embody the spirit of the beautiful custom of tree-planting that is springing up all over the land. Where trees cannot be planted, exercises with blossom, twig and branch from nature, and selections of prose and poetry from literature that breathes of the forest and the field, should aid in the cultivation of that love of nature that gives refinement to the individual, health and prosperity to the State, and beautiful streets and parks, with their elevating and salutary influences, to our city. If in any case it is possible to plant a tree, shrub, vine or flower in the school yard, let it be done in that spirit of sympathy and love for nature which the occasion suggests."

Exercises in celebration of Arbor Day were held generally in the public schools. At the H. Josephine Widener School, Thirteenth and Thompson Streets, six trees, presented to the school by the City Forester, were planted. At the Germantown Combined School a horse chestnut was planted. The teachers of several schools, including the Andrew G. Curtin School, Twenty-second Section, took their pupils to Fairmount Park or into the country, and there held exercises in practical nature work.

The Forestry Section of the New Century Club planted trees at the A. S. Jenks School, Twelfth and Porter Streets, where exercises were held. Trees were also planted at the Philadelphia Home for Incurables, Forty-eighth Street and Woodland Avenue. George Ochs, of the *Times*, delivered an address. The special feature of the exercises was the planting of a tree in memory of the late President McKinley.

Throughout the State the day was also well observed, and special mention will be made of a few.

The Board of Education of Williamsport presented a special circular, giving suggestions for Arbor Day exercises at the various schools.

At Newtown, an elaborate programme was prepared by the borough schools.

Principal Hartman explained the origin of Arbor Day. He said the first public planting of trees in honor of the memory of distinguished people took place in Cincinnati, Ohio, twenty years ago, and that the tree they were about to plant would be known as the "McKinley Tree," in honor of the late President, William McKinley. We want to teach our children the true reasons for the preservation of the trees and forests, as well as for their beauty and the comfort they give. Miss Eva Wentworth, of the High School, read an essay entitled "Arbor Day," and then a number of songs and recitations were given. Capt. Wynkoop delivered an address, setting forth several facts about Arbor Day, and praised the pupils and teachers for their efforts.

Mrs. Heston, a member of the Pennsylvania Forestry Association, also made a short address, praising the work of Arbor Day, saying that the exercises of the day far surpassed anything of the kind that had yet taken place at our borough schools.

In most of the remaining States Arbor Day was also celebrated, although different days were selected.

If all that is said in praise of the mantis, an insect-eating insect, as a co-worker with the farmer and the forester, be true, says *The Evening Post*, its dissemination in this country ought to be encouraged in every possible way. The insect is found commonly in France and in Germany, where it is prized for its destruction of pests. All insects, except ants, are its prey, including grasshoppers, caterpillars, spiders, and the tussock moth. A few years ago it appeared in Rochester, brought there, it is presumed, in a shipment of nursery stock from abroad. It thrived, multiplied, and soon forced a recognition of its value. From Rochester it has been transferred to Buffalo by F. M. Adams, Superintendent of the Buffalo Forestry Association, who hopes, by its aid, to solve the problem of the protection of the trees in that city.

Forestry Work on South Mountain Reservation.

AT its meeting in April, the Forestry Reservation Commission decided to establish, as soon as possible, a forest nursery and a white pine plantation on the South Mountain Reservation, near Mont Alto, Franklin County. In that neighborhood there are many acres of abandoned farm land, decreasing in value each year, but at present affording a splendid opportunity for beginning forestry work. It is the intention that these fields be planted up with valuable species in the near future. To do this it is cheaper for the State to grow its own tree stock than to buy their seedlings from nurserymen, and pay the cost of transportation in addition. Accordingly, the first thing to be done was to locate and prepare a permanent nursery.

Not far from the house of the person in charge of the work was a five-acre field that has been kept in good condition, which proved to be the best available site, and of this the best half-acre was taken for immediate preparation. The soil is fairly good, and was covered with a heavy clover sod. The ground slopes very gently to the northeast, and on the northwest, south and southeast sides of the field there is a strip of pine woods, affording a wind-break and considerable shade in the afternoons.

The half acre was laid out in the form of a rectangle, the long line running about S. 50° W. After the removal of a number of stones and manuring, the ground was plowed and well harrowed. The walks were staked out at right angles, making in all thirty-six beds which are seventy-nine feet long and four feet wide. The outside walks are about four feet wide, and the remainder are three feet. The length of the beds is in the direction of the long line of the rectangle. The beds were leveled after the dirt from the walks was thrown up, making them about one foot high.

Six pounds of white pine seeds were sown at once. One bed was sown broadcast with one and a half pound. The remainder was put in drills about six inches apart, with about six-tenths of a pound to the bed, or 316 square feet.

Before very long twenty pounds of white pine seeds will be planted. These twenty-six pounds should yield between 200,000 and 250,000 seedlings.

Beside the seed sown there has been planted in the nursery 10,000 one-year-old white pine seedlings. These were put in with dibbles, in rows six to eight inches apart, and from three to four inches in the rows. Notwithstanding the fact that the roots had already started this year's new growth and were very tender, and the inexperience of the men in regard to planting, these seedlings are doing well.

Also, as a start on a permanent plantation, 5000 white pine seedlings from four to six inches high were set out on one of the vacant fields. The ground was too wet to plow, so holes had to be dug with mattocks. The seedlings were set four feet apart each way. These, too, had started new growth, but are doing better than was hoped for.

In a few days some improvement cuttings in the young growth of the mountains will be made, and no doubt before the summer is over some work on roads will be done.

This is the beginning of the work, but it is by no means insignificant, for it is the promise of a magnificent work in the future.

GEORGE H. WIRT,
State Forester.

Doings of the State Forestry Reservation Commission.

AT the meeting of the Pennsylvania State Forestry Reservation Commission, held on May 1st, a tract of land situate in Union, Centre, Mifflin and Snyder Counties, containing about 74,000 acres, was purchased for the State. About 6000 acres were also purchased in Huntingdon County, and a tract of 500 acres in Pike County. Acting under instructions from the Commission, State Forester George H. Wirt has established a nursery (described in this issue) at Mont Alto, Franklin County, on which there are growing 15,000 young white pine trees, and seed has been sown for 300,000 more. An ideal spot of land has been selected for a nursery. Water will be piped so as to reach all points of the nursery when necessary. Arrangements are being made now to plant half a million young pine trees next spring, and 50,000 tulip poplars. There is also a spontaneous growth of white pine on the tract, about twenty years old, which will afford a splendid opportunity for the exercise of the forester's art. It will show what can be done by pruning and selective cutting.

The opening of this nursery on the Mont Alto reservation has its uses, also, as an object lesson, and has awakened the greatest interest on the part of the citizens of the neighborhood, who have lent a ready assistance to the operator when it was in their power to do so. It looks like a revival of the old-time industry which prevailed when Mont Alto was a thriving furnace seat.

Slippery Elm (Ulmus fulva, Michx.).

THIS tree is sometimes called red elm, but in Pennsylvania it is better known as slippery elm. I do not now remember one in this State that is more than sixty feet high, or more than twenty inches in diameter.

Its better-known relative, the white, or water elm (*Ulmus Americana*), is a much larger tree, which is in part accounted for by the fact that it usually grows on better soil.

In fact, the slippery elm is rather fond of dry, rough, limestone ridges, though it will grow on good soil. If, however, you follow down the adjacent valleys, you may discover that, as it disappears, the white elm takes its place.

In general aspect the slippery and white elms do not differ greatly, save that the latter is somewhat more graceful in appearance, and, as above stated, larger.

A closer examination, however, shows striking points of difference. In spring time the opening buds of the slippery elm are well covered with a dense brown wool or short brown hair. Keen eyes can even detect, at a distance, that the darker mass of twigs and buds belongs to the red rather than to the white elm.

The illustration of the trunk accompanying this description gives a good idea of the outer bark, and it will be noted that it closely resembles that of the white elm. It is dark, moderately furrowed, and sometimes a little stringy. The inner bark, however, is quite fibrous, and abounds in a mucilaginous principle which renders the ground bark valuable for making emollient poultices for inflamed surfaces. There is a small tree (*Fremontia*) on the Pacific Coast which possesses the same quality, and for which it is also called slippery elm; though it bears no other resemblance to the elm proper.

The heart wood varies in color from brown to red, but the sap wood is much lighter.

There is about the same method of branching in the red elm that there is in the white, though, as its branches are usually shorter and the branchlets less numerous, the graceful droop of the white elm is not so marked in the branches of the red.

The leaves are somewhat heart-shaped at base, ovate or oblong in outline, and tapering to a point. The margin is distinctly, irregularly, notched or toothed. They are on short footstalks, and sometimes become six inches long, though usually they are much less. The upper surface of the slippery elm leaves is quite rough. Indeed, one might, in the dark, recognize the species by this very peculiar character, for it is a roughness like that of no other plant.

The flowers are inconspicuous, and appear in April usually, before the leaves. They are grouped in small clusters on short foot stalks, which come from the sides of the branchlets. Occasionally each individual flower may be perfect, that is, having pistils and stamens, but more frequently but one kind of organ is found perfectly developed in any flower. The corolla, or flower proper, in the popular idea, is not present. It blooms in March or April, before the leaves appear.

The fruit of the slippery elm is ovate or almost round in outline, and its margin is without the fringe of delicate hairs which characterize the fruit of the white elm.

The wood of either white or slippery elm ought to be valuable in the arts, though, as a matter of fact, neither is much used in this country. The elm of England is used there as a planking for small boats, and is considered a good, enduring wood for that purpose. In Pennsylvania the red elm timber is used even less frequently than the white elm, possibly partly because the tree is smaller and less abundant.

The slippery elm grows from the St. Lawrence valley to North Dakota, and south to Florida and Texas.

Its physical properties are: specific gravity, 0.6956; percentage of ash, 0.83; relative approximate fuel value, 0.6898; weight in pounds of a cubic foot of dry wood, 43.35; relative strength, 106.

J. T. ROTHROCK.

The Late Forest Fires.

THE forest fires this Spring have been quite severe, as will be seen from the following newspaper clippings from different sections of the State, giving but an incomplete narrative of the losses from this cause:

Oil City, Pa., April 25.—Forest fires in this vicinity have entailed a loss of many thousands of dollars upon Venango County oil producers.

Reports from Forest County show that the fire is doing much damage in the forest near Tionesta. The big saw-mill at Gilfoyle, near there, was destroyed by fire yesterday, that caught from a blaze in the adjacent woods.

Wilkesbarre, Pa., April 25.—Glen Summit had a narrow escape from damage by forest fires last night. For two days a force of about 200 men have been trying to drive back the flames, which threatened the cottages and hotels. Finally, a counter-fire was lighted in the underbrush close to the hotel and cottages, and this was forced toward the approaching fire, so burning the underbrush that there was no fuel for the main fire to

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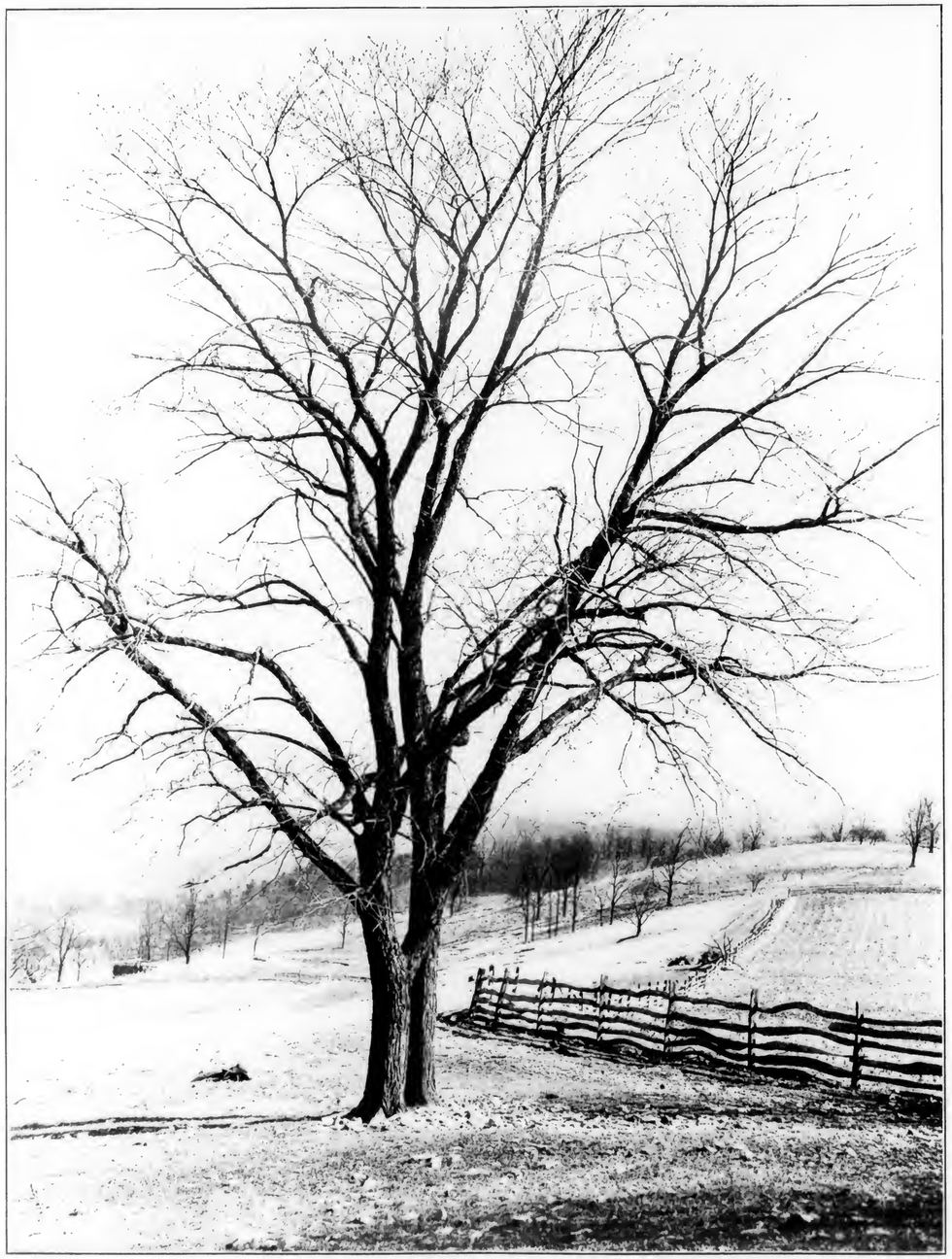

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INTENTIONAL SECOND EXPOSURE

feed upon when the two met. This plan saved the buildings.

Williamsport, Pa., April 25.—Two saw-mills, one at Cammal and the other at Slate Run, have suspended operations, and the men were taken into the forest region to fight fires. Many logs have been burned, and the lumber camps are in danger of destruction.

Emporium, Pa., April 25.—The mill, camp, and lumber-yard of W. D. Johnson, on Canoe Run, three miles from here, were destroyed by fire yesterday, entailing a loss of $50,000. The fire was caused by sparks from a forest fire, notwithstanding hundreds of men were trying to keep the flames back.

Williamsport, Pa., April 24.—During the past 48 hours forest fires have caused devastation to a vast amount of property and the loss of three lives. At Sinnemahoning, fire destroyed a large number of sleepers, and caused the rails to spread, on Barclay's lumber road. An engine and a dozen cars, loaded with logs, were derailed. The locomotive overturned, pinning two of the six men riding on it under the tender. The other four men were unable to prevent their comrades, pinned under the tender, from burning to death.

Fire destroyed ten houses, a church, a schoolhouse, and nine stables at Clintondale, last night.

Thousands of dollars' worth of logs and several saw-mills have been destroyed, and many acres of fine timber are now burning. Residents of the mountain districts are in grave danger, and hundreds are fighting the fires in an effort to save their homes.

A Shamokin newspaper has an editorial on the subject, which reads as follows:

"The destruction which forest fires are causing in other parts of the State, where hundreds of people have been rendered homeless and much valuable property destroyed, should give the persons who started them a few pricks of conscience, at least. Already, in Northumberland county, there has been considerable property destroyed by these forest fires, but thus far no one has been rendered homeless therefrom. This should be a lesson for the season for everyone to be careful about the starting of more fires on the mountains, which are mainly the result of carelessness, for the present fires will be put out by the first heavy rain. Nature will have to quench them, for all that the hand of man can do is to endeavor to confine to certain limits, so that they will do as little damage as possible."

Trees in Paris Streets.

IN the early years of the Second Empire Baron Haussmann submitted to Napoleon III. his famous plans for beautifying Paris by opening new and broad streets and avenues, and said:

"The ideal modern city should have its streets lined on both sides with trees. Trees not only lend grace and attraction to the streets of a city, but awaken in the spring of the year a certain municipal sentiment, as it were. Trees soften the character of the citizens, and make them easier to govern. Trees do not interfere with healthful sunshine in autumn and winter, when it is most needed, and afford in summer shade, and keep the air pure and well supplied with oxygen. Paris ought to have a tree for every inhabitant."

The idea of Baron Haussmann has been taken to heart by the municipal authorities of Paris, where no department has been more scientifically developed than that of street trees, which forms a separate section, distinct from the administrations intrusted with the care of trees growing in the parks and public gardens, which have special budgets of their own, and which form the great breathing places, or the lungs, of the city.

To give an idea of the scale upon which these great lungs of Paris are kept in healthful action, it may be mentioned that the net receipts derived by the city of Paris for renting chalets and places of entertainment in the Bois de Boulogne, Champs Elysées and Bois de Vincennes amount to $226,000 per annum, representing only a small fraction of what the city annually expends upon its lungs, or air reservoirs. The Paris trees are renovated, when necessary, by recruits from the acres of pépinières, or "tree schools," in the environs of Paris.

Whenever a Parisian tree shows signs of decay, a huge truck drawn by four oxen appears, and by an ingenious system of leverage the tree is pulled up by the roots, without injury, by means of a gigantic forceps. Another tree is at once brought from the nearest "tree school" and planted in the place of the invalid tree, which is taken to what is called the tree hospital, where it is replanted, and undergoes a course of treatment.

Paris is essentially a gray city. This, to an artist's eye, is one of its charms. But the delicate soft gray would become monotonous unless relieved by a profusion of green leaves and branches, which lend grace to perspectives of long, straight streets and boulevards. The result is that tree culture has become a sort of religious creed with Parisians, and the scientific care and treatment of the city trees afford food for reflection for the municipal authorities of less favored cities.

The annual cost of maintaining trees in the streets of Paris, where they alternate with lamp-posts, is $90,000. There are 87,693 trees in the city of Paris growing in rows along the sidewalks, exclusive of the trees contained in the city parks, gardens and squares. A corps of tree inspectors is constantly on the alert watching the trees. The soil is frequently renewed. Iron "corsets" are placed around young trees to protect them from injury. A circle at least three yards in diameter is kept free from asphalt or pavement around the base of each tree. This circle is usually covered with an iron grating, to preserve the proper level of the sidewalk. The trees are watered by the street hose twice a day. Excavations are made around the trees, so that the water collects about the base of the trunk and percolates freely to the roots.

The variety of the trees planted comprises horse-chestnuts, elms, acacias, lindens, sycamores and the Japanese sumac. Horse-chestnut trees are great favorites, because they come so early in leaf.

Ever since the Haussmannization of Paris began, fifty years ago, the French Academy of Science and the Health Department of the city have never ceased to impress on the Municipal Council the necessity of maintaining rows of trees along the main streets. The City Fathers fully appreciate that trees materially improve the health rate of the population by absorbing noxious gases and emanations, and by renewing the air breathed by the citizens. Paris has within the mural fortifications a population of 2,660,559 inhabitants. If the public parks, squares and gardens be included in the calculation, it will be found that in Paris there is at least one tree for every inhabitant. The official statistics, however, do not comprise trees planted in public or private parks, squares and gardens, but only those growing in rows along the sidewalks. The number of these trees is 87,693.

It might be interesting to ascertain how the six most populous cities in the United States compare with Paris in this respect. New York, with 3,437,202 inhabitants, in order to reach the Paris standard, should have 104,158 trees planted in its streets, exclusive of those in public or private parks, gardens, squares or back yards. Chicago, with its population of 1,698,575, should possess rows of trees along its sidewalks containing 51,139 trees. Philadelphia, with a population of 1,293,697, should have 39,203 trees in its streets. St. Louis, with a population of 575,238, ought to have its streets lined with 17,431 trees. In order to compete with Paris in tree culture, the 560,892 residents of Boston should have 16,997 trees in the streets. Baltimore, with a population of 508,957 inhabitants, should have 15,423 trees in her streets.

It is probable that some of these cities may have already attained, or even exceeded, the Parisian standard; but all interested in the question of municipal science will be gratified to learn that the tree department of the city of Paris is felt to be of paramount importance for the public health, and the Municipal Councilors of Paris do not regard green foliage as a luxury, but as an absolute necessity.—*New York Tribune.*

Forestry on the Girard Estate in 1901.

THE Annual Report of the Board of City Trusts for 1901 gives an account of the work being done on their forest lands and the damage caused by forest fires. The following excerpts will be of interest:

The reforesting of the mountain lands of the Estate is still a question of serious consideration. No advance has been made in the practical determination of the problem during the past year. The work done in twenty-five years—from 1877, when the first planting of trees was made, to the year 1901—has been protected by fire patrols and fire roads maintained as heretofore. Forest fires extended over large portions of the Estate in March, April and May, 1901, and notwithstanding the efforts of the fire patrol, aided by farmers and citizens called to their assistance, burned over 4250 acres of sprout land containing timber of from one to twelve years' growth. In addition to this spontaneous growth burned, fires burned over a part of the fenced enclosure and destroyed nearly all of the 15,400 white pine and 13,100 Scotch pine seedlings planted in 1899. The estimated value of the timber destroyed by fire in 1901 was $3,044.70. The loss in growth cannot be estimated.

Although much discouraged by the destruction of the young growth of timber upon the Boudinot Estate, in Centre County, referred to in the report of one year ago, the efforts to protect the property from fire and trespass have been continued, with confidence in their ultimate success. One unexpected encouragement in this work has become manifest in the extraordinary growth of the young timber, which has sprung up on the tracts on which the fire of 1900 destroyed all that was then too young to successfully resist it. These new sprouts, with only two years' growth, have already reached to a height more than half that of the previous growth of seven to ten years. The explanation of this abnormal progress probably lies in the fact that the long absence of fire, previous to that of 1900, has brought about a root growth, which, surviving that fire which destroyed its sprouts, now supplies an excessive amount of nourishment, which in turn produces the vigorous sprouting above noted.

The great advantage of this accelerated growth is not so much in the rapid production of timber as in the more early attainment by the young timber of the size and strength which will enable it to survive the passage of fire.

Taking advantage of the opportunity afforded by the destruction of the young timber, a scattered growth of mature timber, mostly "Jack" pine, is now being cut and sent to market. This timber, which was considered worthless when the other matured timber was cut, has, during recent years—partly because of the recognition of its value for mining and building purposes, but more largely because of the constantly increasing scarcity of the more desirable varieties—rapidly increased in value, and now yields a fair rate of stumpage.

Mr. J. G. McClintock, Assistant Superintendent of Forestry for the State of New York, visited the tree plantings, and pronounced the work better than any other inspected by him. He took voluminous notes and a large number of photographs.

The reforestration of the denuded mountains of the coal regions is of vital public importance, but expenditure for that purpose is wasted, if the trees planted are only to furnish fuel for fires started by the malicious or the thoughtless.

Adirondack Forest Problems.

IN discussing this subject, Dr. B. E. Fernow, Director New York State College of Forestry, presents a number of features which are applicable to Pennsylvania and other States as to New York, and we present a few excerpts of special interest from "Report of New York State Fisheries, Game and Forest Commission."

The State of New York, in 1883, determined to retain the forest lands which it then owned; in 1885 it placed them in the care and custody of a Forest Commission; in 1890 the first act authorizing the purchase of additional lands was signed by a democratic governor, with the memorandum affixed that the act was good but inadequate; and in 1897 the Legislature and a republican governor created The Forest Preserve Board, giving it authority to acquire for the State, by purchase or otherwise, control of the entire region within an outline comprising three million acres, more or less, or as much thereof as might appear desirable.

Unfortunately, the State did not embrace the opportunity, when it existed, of acquiring these lands at a low price, and although purchases have hitherto been made in most instances at a reasonable enough figure, the delay has had three undesirable consequences, namely: first, to raise prices; secondly, to allow a further decrease of virgin forest lands, and deterioration of the same by wasteful logging; and thirdly, to allow large tracts to be bought up by private individuals and clubs for game preserves. While at first sight the passing of lands into conservative private ownership does not appear objectionable, inasmuch as the object of the State, namely—a conservative treatment of the forest cover—may, as a rule, be expected from such owners, there is no absolute assurance of the continuance of such conservative treatment. Besides, not only would public ownership of the whole give more satisfaction to the people at large, but in the administration of its property the State could only be benefited by a consolidation of the same and the elimination of interspersed properties. Consolidation and uniformity of administration is perhaps more desirable in forest properties than other properties. Take alone protection against fires; a careless neighbor's neglect in preventing the many causes of conflagration puts to naught the efforts of the more careful. Again, accessibility and means of transportation are of first importance, while foreign possessory rights might often hinder the development of most desirable means of transportation.

Even now the State would not make a mistake, financially or otherwise, if it were to settle the ownership question at once, and acquire without further delay the balance of what it intends finally to own.

At first a forest commission of three unpaid commissioners was charged with this duty of the "care, custody, control and superintendence of the forest preserve, to maintain and protect the forests now on the forest preserve, and to promote as far as practicable the further growth of forests thereon;" also, to "have charge of the public interests of the State with regard to forests and tree planting, and especially with reference to forest fires in every part of the State."

In 1893 the number of the Commissioners was increased to five, with additional powers as to acquisition and lease of lands, and especially the specific power, with certain restrictions, "to sell the standing spruce, tamarack and poplar timber, the fallen timber, and the timber injured by blight or fire." Another change was made in 1895, when an amalgamation of fisheries and game interests with forestry interests was provided, and the (five) Commissioners of Forests, Fisheries and Game were installed.

The first object of the administration, naturally, must be protection of the property; and that means, with forest property, mainly against the dangers from fire. This is the first and foremost administrative problem. The only way to furnish that protection is by proper organization of the fire service, and by reducing the causes of forest fires.

The present law provides a system of firewardens whose duty is to put out fires; and a sufficient number of deputies, properly chosen, properly located and properly instructed, to act at least during the dangerous season, is necessary. They should patrol their beats regularly through the dangerous season, prevent the starting of fires by their vigilance, and extinguish the small fires in their incipiency. The cost of such service, if efficient, will be large, and an argument against it.

At present, bills for fire service are audited and paid by the towns; the tedious delay of such payment is discouraging to the men, who have to wait for the hard-earned money for many months. Authority to make the necessary outlay on the part of the Commission, for which the Board may then seek reimbursement through the town, is the ready remedy.

What is to be done with the forest owned and protected by the State?

The first legislation, instituting the Forest Commission, had in view the application of forestry methods to the management of the property; but the Commission failed to devise such technical management, and the people, as is well known, by constitutional amendment restricted the activities of the Commission by forbidding the cutting of trees on State lands, and thereby ruling out a large share of forestry work.

It is only when the condition of the whole or major part of the property is known that a harmonious, well-considered plan for its technical management can be devised and followed.

It was mainly for the solution of silvicultural problems that the New York State College of Forestry was endowed with an area of thirty thousand acres in the Adirondacks, the tract having been so located as to exhibit the greatest variety of problems that might be met in the entire preserve.

The slashes and old burns present the greatest danger from forest fires, and in most cases they fail to grow useful material. They are not only dead capital, but a menace to the standing timber.

The majority of the people interested in the preservation of the Adirondack woods under State ownership never looked at the proposition as one involving business considerations. Some saw in the wilderness only a pleasure-ground, a health-giving resort, a park to be set aside for the use of those who need and could afford the relaxation of a life in the woods. Others had conceived that the climatic effect and the influence of the forest cover on water supplies imposed the duty on the State to look to the preservation of the forest cover.

It is not necessary to withdraw this large area of land from economic use; it is not necessary to make it an expense, a burden on the taxpayer. On the contrary, the protective function and the luxury function can be subserved as well as the economic function, by a proper system of forest management, which takes into consideration the æsthetic as well as the business aspects of the property.

The forest policy of the State will only be completely and rationally rounded out when the State forests are managed for revenue as well as for the other benefits that may be derived from them under skillful foresters, such as the State College of Forestry is intended to educate.

Street Tree Planting.

IN a former issue of FOREST LEAVES an article appeared on the proper trees for street planting. The late Wm. Saunders described the qualities of a good curbstone tree as follows:

1. A compact stateliness and symmetry of general form or outline as distinguished from a spreading or pendant form, so that the stem can be relieved of side-branches to a height sufficient to allow the free circulation of air below the branches, and also that they may not interfere with the comfortable use of the sidewalks and trees.

2. An ample supply of expansive foliage, of bright early spring verdure, and rich and varied in the colors and tints assumed during autumn.

3. Healthiness, so far as being exempt from constitutional disease, and ability to withstand the many evils which city trees have to encounter, such as reflected heat from buildings, short supplies, at times, of water, and the same of soil.

4. Cleanliness, characterized by a persistency of foliage during the summer, freedom from fading flowers, and exemption from the attacks of insects.

5. It should bear removal and transplanting without much difficulty; not liable to throw up suckers from the roots; of vigorous but not excessive growth. A tree of extremely rapid growth is generally short lived.

6. The branches should be elastic rather than brittle, that they may withstand heavy storms and twisting gales, which are more prevalent in cities than happens in seemingly more exposed situations.

The City of Washington, D. C., has made a study of street trees, and the following excerpts from the report of the Commissioners in regard to the results obtained from different species will be of interest:

Washington was a city of young trees during the seventies, and in the spring of 1873 more than 6000 trees were planted, consisting of silver maples, Norway maples, American elms, American and European lindens, sugar maples, tulip trees, American white ash, scarlet maples, various poplars, and ash-leaved maples.

From 1880 to 1888 the caterpillars were extremely numerous in the city, and opportunity was had for observing which trees were mostly a prey to them. It was found that the white poplar and the negundo or ash-leaved maple were the first to be attacked, and next the lindens, elms, and sycamores (or western planes), and white ash. Those mostly exempt were the Carolina poplars, the sugar, silver and Norway maples, the tulip trees, and honey locusts.

A careful count was made of the trees in 1887, and by comparing this with the number of trees since planted and those removed, there is found to be more than 78,000 trees, which, if placed 30 feet apart, would line both sides of a boulevard between Washington and New York. These consist of more than 30 varieties, but seven-eighths of the number may be placed in less than 12 varieties. The number and peculiarities of the principal trees may be best described separately.

The silver maple (*Acer dasycarpum*) numbers about 25,000. It is almost a perfect street tree, as it stands transplanting well, is quite a rapid grower, and has beautiful foliage, which is never too heavy to allow free circulation of air. It loves moisture, but, nevertheless, stands seasons of drought better than many others. It cannot attain at the curbstone the magnificent proportions that it has in the park or field, and must be trimmed at times very severely. It is seldom attacked by the caterpillar, but some years ago a scale appeared on the trees that caused serious thoughts of their removal. This has since disappeared, and the trees are in a healthy condition. It taught the lesson, however, that it is well not to have most trees of one variety.

The Norway maple (*Acer platanoides*) numbers about 5000 trees, and it is unfortunate that more of them were not planted in past years. They require considerable care in transplanting, and are a little too thick in foliage. They are handsome in leaves and form, and are strong of fiber, so that they withstand storms well. Insects seldom trouble them.

The American elm (*Ulmus Americana*) numbers about 5000 trees, planted on various avenues. It is a tree of spreading form, so that on roadways 50 feet wide its limbs arch the entire space. From this it is liable to be split by storms. It presents a magnificent appearance at certain times of the year, but the elm-leaf beetle has preyed so constantly on this tree that it is either doomed to disappear as a street tree, or else be limited to a small number.

The buttonwood, sycamore or plane tree (*Plantanus orientalis* and *occidentalis*) numbers 5000 trees. It is a tree of large growth, and must be closely trimmed as a street tree. The western plane is not an altogether handsome tree, its shedding of bark giving its trunk an ugly appearance, which is objected to by many. As a shade producer it has no fault. The eastern plane is its superior in many respects, and it seems unfortunate that its merits were not recognized sooner. Its size and nature make it better fitted for avenues than the narrow streets. Its foliage is splendid in appearance, and of proper thickness. It is free of insects.

The American linden (*Tilia Americana*) numbers 5000. In early summer they are at their best, when their flowers fill the street with their fragrance. They need ample space, and are apt to suffer from the drought. They seem to have been planted too close in this city, and have grown very little in late years.

The tulip tree (*Liriodendron tulipifera*) numbers nearly 2000. It can hardly be considered a good curbstone tree, as it requires good conditions for its development. It is fine in appearance, and does well on wide parkings.

The Carolina poplar (*Populus monilifera*) numbers about 6000, and was probably planted on account of its rapid growth. It is a good curbstone tree in many respects—is assertive, free of insects, and is of good foliage. Its bad qualities are, brittle limbs, which are always broken by storms, and a persistency of root growth that is fatal to sidewalks. Money considerations have doomed them, and they are being replaced with more desirable trees.

The aspen poplar (*Populus alba*) and ash-leaved maple (*Acer negundo*), numbering about 2000, although of good foliage, have been condemned as street trees on account of their liability to attacks of insects.

The gingko or maidenhair tree, although few in number here, has been found to be a good curbstone tree. The pin oak has shown itself an ideal tree for an avenue or wide-parked street.

Horse-chestnut trees have grown with some little success, but cannot be called a good street tree.

The sugar maple, although a queen among trees,

needs too good care for an ideal street tree. No success has been had with it, although it may be said that attempts have not been persistent.

The red oak, planted where it is surrounded by good conditions, has been a great success.

If required to arrange a list of the trees in this city in the order of their merit, and in the light of what has been here shown, the silver maple, Norway maple and eastern plane would be placed side by side in the first rank. Then the gingko and western plane; and, last, those that require extra care, and are well fitted for wide parkings—the American linden, the oak, and sugar maple.

The planting and care of trees in Washington grows from year to year, and the future will probably demand more skill and judgment than in years past. About $20,000 is spent annually, most of it in the care of old trees. From 1000 to 3000 young trees are planted during the spring and fall of each year. The nursery has several thousand of the best varieties ready for planting. After two or three years as seedlings, and four or five years in the nursery rows, they are taken up, with no dirt to their roots, and placed on the streets in holes from which four or five cart-loads of original soil have been removed. They are then filled about with suitable earth, and a box placed around for protection. These boxes are 7 feet in height, 16 inches square at the botton and 10 inches at the top, built of strips 1 by 3 inches. They are held by four stakes driven into the ground on each side in a slanting direction, and nailed to the box. Leather straps are nailed to the top of the box and passed around the tree, to prevent any injury to the bark or rubbing in windy weather. These boxes are not an ornament to the street, but are an absolute necessity for the protection of young trees. After the tree has gained sufficient strength, the box is removed, and a wire netting 6 feet long is fastened around the tree. It cost about 35 cents per tree, and some 40,000 trees are protected in this way.

The proper distance to space trees depends on the locality and variety. Too close planting was done during the first year of the commission, the distance along the curb being from 20 to 25 feet. From 30 to 45 feet is now considered a better limit.

The trimming of trees is a bone of contention among authorities, as to time, manner and extent. It is certain, however, that some city trees must be trimmed, and trimmed severely, if they are expected to last long.

New Publications.

Practical Forestry, by John Gifford, Assistant Professor of Forestry in New York State College of Forestry, Cornell University. Appleton & Company, pp. 284, with many illustrations.

Mr. Pinchot's Primer of Forestry is not yet completed. The work of Professor Gifford is, therefore, the first completed practical treatise on the art and science of forestry published in this country. There are other books which aspire to this title, but they have been written either from the standpoint of the tree-lover or from that of the nurseryman, and lack the knowledge of detail which is needed for true forestry work here at this time.

It is very doubtful whether there is in the country another man so well qualified as Professor Gifford to give, in popular language, an exact statement of the laws and rules of forestry. It is, therefore, almost impossible to over-estimate the importance and value of his book.

It is quite true that much that is of importance has been omitted, but this is in great part due to the fact that the author was writing a compendium, and not an extended system of forestry. The wonder is that he has found place for so much information. His pages "bristle with facts," which are stated in the clearest manner.

It is impossible to give an adequate review of this book within our limits. We will merely say that Part I, introductory, has 90 pages, and is devoted to the meaning of forest and forestry; wood-lots on farms, forest estates, and the relation of silviculture to the kindred art; the forest canopy, forest floor, and wood mass; the forest as an agent in modifying the surface of the earth and in checking the destructive forces of nature; the geographical distribution of forests. All the above information appears necessary at the present time to place the science of forestry on a proper basis in the popular mind. Part II is devoted to the formation and tending of forests. Part III treats of the industrial importance of forests. Part IV is supplementary, and treats of the Federal and State reservations, and gives also some interesting statements concerning fifty species of our American forest trees. We regret to see the popular error perpetrated of calling the Tillandsia, found on the Southern trees, a moss, when it is a true flowering-plant. The chief criticism we have to offer is that the part treating of "the formation and tending of forests," which, after all, is the chief part of forestry, and in which instruction is most needed, is disposed of so briefly. It should have been twice as long, and could have been done by no one in our country better than by Professor Gifford. This book cannot be too widely circulated. J. T. R.

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	Each.	10	100
7 to 8 ft.; trans.,	$0 35	$2 50	$22 50
8 to 9 ft.; trans.,	50	4 00	30 00
9 to 10 ft.; trans.,	75	6 00	40 00
10 to 12 ft.; 1¼ to 1½ in.; trans.,	1 00	7 50	50 00
12 to 14 ft.; 1½ to 1¾ in.; trans.,	1 50	12 50	100 00
14 to 15 ft.; 1¾ to 2 in.; trans.,	1 75	15 00	125 00
Larger trees, 2 to 2½ in. diam.; trans.,	2 25	20 00	150 00
Larger trees, 2½ to 3 in. diam.; trans.,	3 50	30 00	
Larger trees, 3 to 3½ in. diam.; trans.,	4 00	35 00	

ANDORRA NURSERIES,

WILLIAM WARNER HARPER. CHESTNUT HILL, PHILA., PA.

Forest Leaves

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The attention of Nurserymen and others is called to the advantages of FOREST LEAVES *as an advertising medium. Rates will be furnished on application.*

The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, One dollar.
Life membership, Fifteen dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to *A. B. Weimer*, Chairman Membership Committee, 512 Walnut Street, Phila.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

CONSIDERABLE indignation has been expressed by citizens of Philadelphia because excavations are made in sidewalks, cutting roots of many trees. The excavations are to accommodate telephone conduits; and, as these parallel the curb line, few of the trees which ornament and shade the sidewalks escape damage. Whether the company placing these conduits has any right to use the sidewalk at all is questionable, and competent authority has asserted its action to be trespass. But it is not this aspect of the case which appeals to FOREST LEAVES. Our contention is that the unnecessary cutting of tree-roots at a season when they are fulfilling their functions to their ability, is vandalism. No milder term will express the action of those who dwarf the life, and in many cases cause the death, of shade trees, whose maturity has been secured by many years of existence—an existence maintained under numerous discouraging conditions.

We believe that the same law which has been sustained by the courts of Pennsylvania, and which has held corporations responsible for damage to trees—for ruthlessly cutting branches, etc.—will make these corporations equally liable to damage resulting from the destruction of tree-roots.

Public sentiment is certainly being educated to respect the trees, whether they are the few which struggle heroically against environment on the city sidewalks, or the many which, as individuals, form the forests; and public sentiment cannot be too pronounced in condemnation of injury to trees in either location. A few evidences of determined opposition, such as was made by Dr. Marshall, of the University of Pennsylvania, are needed. It will be remembered that when a telephone company destroyed some and injured other trees on Dr. Marshall's property, he instituted criminal and civil suits, which he carried to the highest court—winning a signal victory, and

proving that in Pennsylvania a tree has a right to live and grow.

The interests of forest protection are advanced by the punishment of those who set fire to woodlands. It will be equally advanced by action such as demands and secures protection to individual trees—whether on country roads, private lawns or city sidewalks.

* * * * *

THE passage of what is known as the "Irrigation Bill," and the appropriation for large reservoirs in arid and semi-arid areas in the United States, has an indirect, if not direct, connection with forestry. The value of the reservoirs which it is proposed to construct will be largely influenced by the character of the drainage basins, and among the influences will be the extent to which these areas are covered by forests. As the purpose of the reservoirs is to store water to supply irrigating systems, their construction and maintenance will preserve tree growth on the area indicated.

As far as the present control of the proposed reservoirs is concerned, the friends of forestry may feel that every effort towards forestry preservation will be made by Mr. F. H. Newell, who has shown in a number of ways his interest in forestry and his desire to advance it; hence the new bill will be administered in the interest of forestry by the Division of Hydrography.

We congratulate Mr. Newell on the success which has followed his efforts to secure a comprehensive irrigation policy, but we realize that he must now face the most serious problems in the determination of sites for reservoirs, in the preference given to different localities, as to the time when they are to be constructed or the rate at which they are to be built, and, undoubtedly, the solution of these will be hampered by the persistency of those who have political influence in the effort to obtain preeminence for specific localities. Hence, in addition to sound judgment and engineering skill, the Division will need diplomacy and a great deal of what is familiarly known as "back-bone" to carry out the late legislation. J. B.

* * * * *

Camp and Plant, an entertaining and instructive illustrated weekly, is published by the Sociological Department of the Colorado Fuel & Iron Company, at Pueblo, Colo. Its purpose is to bring into closer relations the 15,000 to 20,000 employees of the company engaged in its ore- and coal-mines, its coke-plants, and iron- and steel-works in the States of Colorado, Wyoming, Utah, and the Territory of New Mexico. A late issue was devoted mainly to discussing forestry, and among the papers specially worthy of merit was one detailing the havoc of the pine beetle, and calling attention to its ravages in Colorado forests, and another upon birds and forests. J. B.

Council Meeting at Buck Hill Falls, Pa.

THROUGH the courtesy of Mr. Howard M. Jenkins, President of the Buck Hill Falls Company, the Council of the Pennsylvania Forestry Association was invited to hold its regular June meeting at the Inn at Buck Hill Falls. Two sessions were held on June 10th.

The Inn is located at an elevation of 1600 feet above sea level, on the crest of a spur of Buck Hill, in the heart of the Pocono Mountains. From the observatory fine unobstructed views can be obtained in all directions. To the southeast the break in the Kittatinny Mountains at the Delaware Water Gap is plainly seen, while to the north is a rolling mountainous country, well wooded, but interspersed with cultivated valleys, forming a delightful panorama.

On the morning of June 10th the regular meeting of the Council was held, and the following vote of thanks passed:

Resolved, That the Council of the Pennsylvania Forestry Association desires to express its thanks to Mr. Howard M. Jenkins, President of the Buck Hill Falls Company, for the gracious courtesy and generous hospitality shown during its visit to Buck Hill Falls, and also at the same time wish to place on record its high appreciation of his earnest, intelligent and valuable services on behalf of the work of the Pennsylvania Forestry Association.

A *resume* is given of some interesting subjects which were discussed.

After discussing a suggestion that travelling libraries, say of 20 volumes each, treating of forestry, birds, and out-of-door life, including a volume of FOREST LEAVES, the books bearing the endorsement of the Pennsylvania Forestry Association, would aid in educating the public, it was resolved that the Council recommends that Dr. Reed, State Librarian, establish several such libraries.

Dr. W. P. Wilson spoke of the work which the Philadelphia Commercial Museum had started, but was obliged to discontinue on account of lack of funds. The museum obtained from various manufacturers 60 specimens of the woods generally used, 40 being native species and 20 foreign. These specimens were cut to show the cross section, grain of wood, etc. Pictures of the various trees were made, and printed descriptions placed on the back; all the applications of the different woods were mentioned, including wood

pulp, etc.; 225 of these loan collections had been sent out, and he had been besieged with requests for more, which he was unable to grant. If an appropriation had been made, additional sets could have been completed at low cost. None of these collections were sent out until a suitable place was prepared by the school for their installation.

Dr. Rothrock spoke of the need of a forestry school where the people would become skilled in forestry practice, one half of the time being devoted to practical work in the reservation, and one half to study. No State appropriation had been made for such a school, but Mr. Geo. H. Wirt and his sister, without any assured compensation, had started a school at Mont Alto. At present there were but two students, but if the coming Legislature grants an appropriation for it, the house could easily be filled from applications on file. He stated that by the close of the present administration there would propably be 500,000 acres in the State forest reserves.

The subject of camps for consumptives was then taken up, and it was stated that the hotels and summer residents of the Pocono Mountains and other resorts objected to any such camps in their vicinity, owing to the danger of contagion. The great benefits to be derived from this out-of-door treatment was mentioned and cures cited. These consumptives must be cared for, and if the camps were put on some of the State forestry reservations, removed from any town, with proper safeguards thrown around them, there would not be near the danger of contagion which exists in our thickly populated cities. The grandness of this work was dwelt upon, and it was suggested that Dr. Rothrock prepare a pamphlet on the subject. Mr. Harvey contributed $100 for printing and distributing these. It was urged that the Association support Dr. Rothrock's idea of barracks for consumptives, feeling sure that it would have influence enough to have this plan carried out.

Dr. Wilson said that application had been made to him for a man to take charge of and forest a tract of 100 acres. The person owning the tract offered to erect a house and give all of the crops which might be raised while the trees were growing. This was thought feasible, as crops of different varieties could be raised while the trees were young, and as they became larger and truck farming was impracticable, the trees could be thinned out and sold or made into hoop poles, etc., so as to obtain revenue from the tract and at the same time benefit the trees.

The steps taken by the railroads to plant tracts of trees in order to supply ties for future needs, were mentioned, and it was stated that the Pennsylvania Railroad had set out 30 acres of locust trees at Newton Hamilton.

The growth of young trees was discussed. Measurements taken at Graeffenburg showed that in poor soil the average growth in height in white pine trees in 12 years was 7 feet, and in good soil 18 feet. These trees grow quite fast after attaining an age of 8 years, being about 18 inches a year, until the tree becomes 30 years old.

The influence of the Pennsylvania Forestry Association in other States was discussed, numerous applications being made for copies of by-laws, etc., and the different States had enacted laws patterned after those formulated in Pennsylvania.

The great benefits of forestry reservations for maintaining the health of the people and preserving the water supply were dwelt on at length. The statement was made that there was now within sight in this section water sufficient to supply a population of 1,400,000. The Bushkill Creek, measured at its supposed minimum, showed a flow of water great enough to meet the needs of 700,000 people, and another supply equally large could be easily thrown over into this Creek. The time will come when Philadelphia will want to get the best water obtainable, and then filter it, and this section would seem to be easily available for this purpose.

Attention was called to a process for making fallen leaves into pulp, extracting from them tannic acid and other wood products. A company had been formed, and claimed to be able to secure enough tannic acid in 10 ton lots to pay expenses, leaving the other products for profit. But the constant robbing of the leaves from any particular section would destroy the fertility of the ground.

Invitations for meetings in the Fall and in 1903 were mentioned.

Mr. Harvey spoke of the question of the future of the lumber industry, which could only be preserved by conserving the forests, and, to show the interest taken in the subject, quoted from Dr. Pinchot's report as Forester, showing the number of calls made on his Bureau for advice, the increase of appropriations for this Bureau, etc. To illustrate the growth of timber, he instanced one tract cut over at the time of the war of the rebellion on which the trees were now 16 or 17 inches in diameter.

On motion, a recess was taken.

After the recess an inspection was made over the estate of 320 acres, which is generally heavily wooded and made beautiful by the laurel blooms in June and great clusters of rhododendrons in July. By means of well-defined paths the beautiful Buck Hill Falls was reached, where a

clear mountain stream dashes down 200 feet in one-half a mile. There are several minor falls, but the two principal ones are the "Double Falls," of 41 feet and 15 feet respectively, and the "Lower Falls," of 34 feet.

In the afternoon carriages were taken and a trip made to neighboring woodlands, the party passing through Canadensis and Spruce Cabin on the return trip.

In the evening Dr. J. T. Rothrock gave an interesting and comprehensive talk on the growth of the forestry movement.

He said that in an old dictionary no mention was made of the word "forestry," and in a later edition it was merely spoken of in the way of making provision for a home for game, forestry itself being unknown.

William Penn was responsible for a law that one acre in every five should be kept in timber, and it is remarkable that this is about the proportion which is now advocated. Penn's advice was, however, disregarded, as it was necessary to cut down the trees in order to use the ground for agricultural purposes, and as there was plenty of timber available, it was thought, to be practically inexhaustible.

In his lifetime Dr. R. had seen the greater part of the State cut over. In one township in Pennsylvania, which formerly was covered by great pine forests, all the timber had been cut off, and it was necessary for the Judge of the Court to appoint a road committee from neighboring townships to look after the public roads, as this township, which once supported a large population dependent on the lumber industry, did not now, owing to the complete destruction of the timber, yield enough taxes to keep the roads in repair.

He could say that in his lifetime, owing to the cutting down of the timber and the damage done by fire, one-sixth of the entire area of the State of Pennsylvania was unproductive.

Two decades ago anyone who advocated forestry was considered a fanatic. It is worthy of note that the first and one of the best speeches in favor of forestry made in Congress was by Mr. Haldeman, a Pennsylvanian.

Sixteen years ago the Pennsylvania Forestry Association was started in Philadelphia by some ladies, and the Association has shown a constant increase, until it now has on its roll 1650 members.

In 1893 a Forestry Commission was appointed by an Act of the Legislature to make a thorough and comprehensive examination of the forest lands of Pennsylvania, reporting at the next meeting of that body.

This was done, and when the Department of Agriculture was established, it included a Bureau of Forestry, thus incorporating forestry in the State government, also authorizing the establishment of forest reserves in different portions of the State by the Forestry Commission. Subsequently, in 1901, the Legislature created a Department of Forestry, thus making its head a member of the official State cabinet (if there was such a body), enabling it to disburse its own appropriations, placing under it all forest lands already acquired or to be acquired,and having the power to purchase additional land for forest reservations. At the present time the State owned or would shortly own about 500,000 acres of timber land.

The great need at the present time was skilled help to administer the State forest reservations; not men who graduated from college with degrees, but men who had been taught both practically and theoretically how to meet the various problems connected with a successful forest administration and were familiar with this State. A small beginning has been made at Mont Alto, where two young men are taking rudimentary courses in forestry, besides taking care of the forestry nurseries and timber land located there. This is a nucleus to build on; and, if the coming Legislature will make an appropriation for the school, in a few years Pennsylvania will be well fitted to take care of its forestry reservations.

The work of the Association is not finished; in fact there is now more need of it than ever, and he hoped all of our members would give their active support when needed.

The subject of forest fires was then discussed. Mr. Albert Lewis described the method pursued on his estate at Bear Creek, Pa. Whenever it did not rain for three days during the danger season, a man was placed on top of a summer house commanding a bird's-eye view of the property, and as soon as any smoke was seen it was his duty to at once notify (by means of a megraphone) the proper party of the location of the fire, and, owing to the excellent roads, it was but a few minutes before a body of skilled men were at the point of danger.

The trouble with foreign foresters was their lack of knowledge of American conditions. One instance was cited in which a regular graduated European forester in this country, in burning brush in the woods, piled it up in heaps, lighted it, and burned in each heap a number of healthy, growing trees, when he should have thrown the refuse back in the fire-lines, to be burnt.

It was thought that in this section a fire-line should be 50 feet wide, the brush, as it grew up, being cut, thrown in the middle of the lane and burnt.

Mr. Howard M. Jenkins gave some interesting data in regard to Colonial days, and stated that in 1679, before William Penn came to this country, a ship had ascended the Delaware to the site of the present city of Philadelphia, and when near Callowhill Street it was found that the ship could approach so near the shore that the yards were in danger of becoming entangled in the trees. They then made the remark that it would be a good place to establish a city, which idea Penn carried out later on.

The meeting then adjourned.

The next morning the party left the Inn, with delightful memories of the pleasant and instructive visit to Buck Hill Falls.

Department of Forestry. World's Fair, St. Louis, 1904.

IN the year 1904, for the first time, the United States will be in a position to make, at a World's Fair, a creditable exhibition in Forestry.

Hitherto we have contented ourselves mainly with showing billets of wood and photographs of forest trees, or of forest scenes. This was well enough as far as it went, and might very properly, if good selections were made, continue to be a part of all such expositions.

Circular I., issued May 12, 1902, gives somewhat in detail the forestry portion of the Official Classification, and no doubt application made to Tarleton H. Bean, Acting Chief, Department Forestry, World's Fair, St. Louis, would secure all needed information.

We hope the friends of forestry will endeavor to make a creditable exhibition of forest tools and products, and of whatever will increase the importance of our National or State Forestry exhibit.

In the matter of harvesting the forest crop, so far as quick lumbering is concerned, we can lead the world. It does not follow, however, that we are realizing all from the cut that we should, or that some of our own methods are not shamefully wasteful. We are in sight of the period when we shall have to reconsider the prodigal ways of our youth.

A striking illustration of this may be found in the fact that thirty years ago, no matter how good the stick of white pine was, usually only the best of the log was taken. The remainder was allowed to remain on the ground. To-day that same abandoned pine, after becoming coated with the decay of a third of a century, is being industriously hunted up, to manufacture into shingles.

It has become valuable enough for thieves to steal and for owners to protect. We are informed of several suits now pending, growing out of this once abandoned but now valuable shingle wood.

J. T. R.

Lumbermen and Forestry.

AT the late meeting of the National Wholesale Lumber Dealers' Association, a large part of the report of the legal department, presented by John J. McKelvey, of New York, treated of the perpetuation of the lumber industry by means of forestry, taking strong grounds in its favor, as follows:

I have watched with a considerable degree of interest the development of projects for the encouragement of a proper system of forest care and culture, but it has impressed itself upon me, as it must have upon any other observer, that the progress so far has been along theoretical rather than practical lines, and has been the subject largely of academic thought and effort. It is true that in several instances, where the modern fancy of very wealthy men has induced them to acquire large tracts of wild lands, experiments in forestry have been attempted, but the principles of forestry have yet to have their first application in the realm of practical business life.

If one gets into the frame of mind where the lumbering business of a country can be viewed as though from a distant standpoint, so that the mind's eye can take in the scope of an entire country's operations, and can extend its observation over both, past, present and future, it becomes very clear how important a part in the profitable conduct of the lumber business the application of approved forestry principles might play.

In the present conditions respectively of the lumbering industry and of the science of forestry the mind immediately perceives a justifiable opportunity to bring the two together to their mutual advantage, and to the lasting benefit of the public at large. Much has been and can be written and said about the subject of forestry which is calculated to engross the imagination and absorb the interest of those who approach the subject from a sentimental standpoint. The proposition is that upon the lumber people themselves depends the preservation of their own business; that in all probability they will alone determine whether they will continue to carry on their operations for all time to come, or so misdirect their efforts as to number the years of that business.

It is quite evident that no single lumberman can accomplish anything along the lines suggested. It is also quite clear that in the absence of govern-

mental interference no man or body of men outside of the lumber dealers themselves can or will make any progress toward the establishment of better conditions in the treatment of our forests. It follows inevitably that the lumbermen as a body through themselves, or some other association or organization, must seriously take up the question and find proper means for its solution.

It seems inevitable that some closer organization of the entire industry will take place in the not very distant future, and that such organization will have as one of its reasons for existence the enforcement, either with or without Government co-operation, of a forestry system. Such a condition, however, may be in the near or distant future, or may never come about.

A Study of the Chestnut Wood Lot.

SOME studies made by the forestry class at Westtown Boarding School, in Chester County, Pa., during the past winter, disclose a few facts which might be added to the literature of the wood-lot. The tracts worked on are all in the immediate vicinity of West Chester. The current increment was obtained from stump measurements by Schneider's formula as adopted by the U. S. Bureau of Forestry.

Table of results. Species chestnut.

Class.	Number of trees.	Average age, years.	Diameter, inches.	Current growth.	Price.
A	36	80.5	24.5	1.6 per cent.	$2.60
B	137	30.6	13.5	4.4 " "	1.50
C	15	59.7	22.9	4. " "	4.10

In the first case, of the fifty trees studied, 75 per cent. (Class A) were over ninety years old. The percentage of current annual increase at time of cutting was 1.6. The poles from these netted only $2.60 each, though they were of good size, because the shafts had become brittle as rapid growth had ceased.

In the next tract all the stumps were studied in the same way, then a representative area was measured and counted to get the stand per acre for the whole. Of the 171 trees taken, 80 per cent. (Class B) were in the 30–40 year class, the average for the trees in this class being 30.6 years. These poles, cut to twelve and six inch diameters at the two ends respectively, and thirty feet long, brought $1.50 on the stump. When cut, these trees were growing at the rate of 4.4 per cent., and, considering the fact that the increase in the value of poles is more than proportional to the increase in size, it is very evident that they were cut at a sacrifice. Larger poles (on the same lot, but owned by another party) (Class C in table), averaging between fifty-five and sixty-five years and still growing at the rate of 4 per cent., netted the owner $4.10 on the average.

On the tract where the thirty-year poles were cut, it was found that before the cutting there were standing, per acre, of chestnuts ready to cut (since cut), 30; smaller trees, down to 5 inches, 75; of other species, chiefly red oak and tulip poplar, 57. Total, 162, not a normal stand.

Figures are deceiving, and always may be made to lie in giving conclusions. There are so many variable elements to be considered in deducing from such data that I shall leave the task to the reader. But as I look at it, with land at the low values now ruling in this locality, and with the tax reductions allowed by recent legislation, it does not take a close calculation to see that such a crop is paying a larger interest on capital invested than many farmers are getting from their staple crops. The careful farmer gets also a good supply of fencing from the tops left by the pole men, and may sell even the crooked tops and large branches to the dye-wood makers for $3.50 per cord.

A study of sample trees of a tract of land cut clear twenty-four years ago shows still another interesting feature of the chestnut, and suggests the desirability of introducing the tulip poplar as its growing mate. One hundred poplars and four hundred and forty chestnuts were calipered, and four poplars and eight chestnuts cut as samples were accurately measured. The results were nearly uniform, although the samples were taken from very different situations. Average results:

	Age, years.	Diameter at stump, inches.	Current Growth.	Usable length, feet.	Cubic feet.
Chestnut, . .	24	8.9	8 per cent.	31.6	7.2
Tulip poplar, .	24	8.	9 " "	30.	7.7

The exact value of such chestnuts is difficult to estimate, as the value of fencing varies greatly; but it is safe to count on a thinning as paying for itself. At prices received for tulip poplar pulp wood here in 1901, the average sample tree is worth 37 cents as it stands. As chestnut at best will not yield nearly half this amount, and as the poplar shows the more rapid growth in youth, I think that poplar and chestnut could profitably be planted in mixture. The proportion should allow for a thinning of poplar at from fifteen to twenty years, a second thinning of both species ten or fifteen years later, the final cutting of chestnuts at about eighty years, and the crop of standards of poplar at one hundred or more years, when their timber is most valuable. There would probably be several intermediate coppice thinnings. Such a system would provide for a continuous cover of our most beautiful broad leaf trees, and could be made profitable, easily within the lifetime of a man—if he did not leave the planting too late—and once started would yield a continuous revenue for very little outlay. The chestnut and the tulip poplar are certainly the species the Chester County wood-lot owner should produce.

ALFRED S. HAINES.

Suggestions to Clubs Taking Up a Study of Forestry.

THE following is the text of a circular letter to Women's Clubs, issued by the Pennsylvania Federation of Women's Clubs, giving an outline of work to be pursued:

"The primary object of women's work on forestry is, in Pennsylvania, to develop or to maintain public interest in forestry generally, and in the Department of Forestry especially, with a view to effective support of the policy of the Department.

"Secondary objects are:

"Tree planting in streets, school grounds, or other places.

"The establishment of parks, the protection of our native plants, and the preservation of beautiful places.

"As the work of Women's Clubs has been cordially recognized by the Pennsylvania Department of Forestry, and also by the Bureau of Forestry at Washington, it is very desirable that all Clubs should be up to date on forest legislation and related matters.

"The Pennsylvania Department of Forestry has recently published two valuable pamphlets. The first, on "Pennsylvania Laws Relating to Forestry," contains two classes of laws: those relating to broad measures and those relating to the individual.

"Of the former, the fire laws, beginning on pages 11, 16 and 23, and the Department acts on pages 13 and 18, are the most important.

"Of the second class of laws, those on page 24, relating to roadside planting, and on page 8, regarding the relations of tree owners, telegraph and electric light companies, are of great interest. These acts should be supplemented by FOREST LEAVES for June, 1901, containing Justice Brewer's decision in a celebrated tree-cutting case. The second pamphlet, on "Forest Trees" (by George H. Wirt, Forester), is very valuable for the clear and explicit directions it gives about the planting and care of trees. All clubs should apply for these two bulletins.

"After preliminary reading of our State laws, some time should be devoted to a study of the Reservations now being established in different parts of our State. They comprise such valuable and beautiful tracts of land that they will prove of great interest.

"A little study of other States will disclose the fact that Pennsylvania is far advanced in its forestry laws, and has a well-defined policy that commands great respect, in which all citizens should be deeply interested."

The circular also recommends membership in the Pennsylvania Forestry Association, and subscriptions to forestry periodicals.

Forestry at Mont Alto.

OUR readers will be interested in the following extracts from a personal letter sent by Mr. George W. Wirt, Forester, in regard to the work he is doing on the Mont Alto Forestry Reservation:

Until lately, attention was put upon the nursery in weeding and working the young seedlings (one year old). Dr. Rothrock had some woven slat fence sent out, and this was fixed over the beds for shade. The seedlings in the nursery, and especially the two-year-old ones in the plantation, are doing far better than was expected. A very small percentage have died. The seeds, however, are slow, due, no doubt, to cold and dry weather for something over a month from date of planting.

July 2d work was begun on a bad road leading to one of the largest and best springs. The road is used a great deal, but not being a public road, was in bad condition. It was thought that perhaps by simply removing the stone and rounding it somewhat, it might serve as a lesson. The work surely makes a difference.

A number of pruning saws have been secured, and about the middle of July work was begun on about twenty acres of natural growth of white pine, possibly twenty-five years old. The dead branches were cut off, and the dead and suppressed trees taken out.

Mr. F. von Hoffmann in a late letter says: "I am exceedingly sorry to inform you that the practical courses in forestry contemplated for this summer have been postponed indefinitely, on account of the fearful devastation done by the forest fires in Luzerne County, Pa. All of the preserve upon which the practical courses were to be held has been completely burnt over, nothing but the nursery having been saved."

Jersey Scrub Pine. Scrub Pine. (Pinus inops., Ait.). (Pinus Virginiana, Mill. Britton & Brown. Illustrated Flora, Vol. 1, p. 52.)

THE tree under consideration now seems to have no generally accepted common name in Pennsylvania, for the simple reason that it is not recognized by the people as different from the more dwarfed and rugged specimens of yellow or jack pine. As between the scrub and the yellow pine, the latter varies, as a rule, more in the direction of the former than the former (scrub pine) does toward the latter (yellow pine).

To add to the difficulty, the two trees are often found growing side by side, and the number of leaves in the clusters of each species, upon the same tree, may be either two or three, though, of course, it is admitted that this leaf variation is an exceptional character rather than the rule.

I sometimes think I recognize the scrub pine by the multitude of cones remaining upon its scraggy branches and by the low stature of what seems to be an old tree. A nearer approach, however, shows that there are three leaves in the sheath, and that these leaves are too long for the scrub pine. Hence I am driven to the conclusion that I had, after all, merely a starved yellow pine under observation.

I at one time thought the blue-purple tinge of the young branches a pretty good specific mark. All that I can now say is that it is fairly reliable when present, but it is not always present on what otherwise resembles scrub pine.

But in spite of all the above, a low, branching, many-coned pine tree which has but two leaves in a sheath, and these leaves not more than two inches long, is pretty sure to be a scrub pine if found in Pennsylvania.

I do not know of any species of tree which responds less favorably to good treatment than this. Whenever or wherever found, it seems to retain its rugged character. The yellow will grow alongside of the scrub pine upon our poorest hillsides, and both will be equally dwarfed. But if you were to transport both to a fertile soil, I am sure that the yellow pine would grow into a large, graceful tree, and show by its whole appearance that it had taken advantage of every favorable chance to improve its condition. I think, however, that under the same circumstances the scrub would remain a scrub. In this "difference of blood" the distinction between the two mainly rests.

Still, the scrub pine is better than nothing. It often serves to hide the nakedness of a place where it would "be a pity" to have a yellow pine waste its possibilities.

I am told that the tree grows larger in Kentucky and in Illinois, and am glad that we have in the United States a soil and climate stimulating enough to bring the scrub pine into a condition of respectability.

This tree was once much used to make charcoal and pump-stocks, and no doubt still is, to a limited degree.

The scrub pine occasionally becomes fifty feet high and a foot or more in diameter, as in the case of the larger specimen shown in the woodland form illustrating this description; but the smaller, more branching and spreading tree, less than forty feet high, is the more common type in Pennsylvania.

The physical properties of the wood are, specific gravity, 0.5309; percentage of ash, 0.30; relative approximate fuel value, 0.5293; weight in pounds of a cubic foot of dry wood, 33.09; relative strength, 214.

J. T. ROTHROCK.

The National Appalachian Forest Reserve.

THE bill authorizing the purchase of certain mountain lands in the Southern Appalachian Mountains for the purpose of a National Forest Reserve of 4,000,000 acres, to be selected by the Secretary of Agriculture, and appropriating a sum not to exceed $10,000,000, of which only $2,000,000 is immediately available, has passed the Senate, and will now be in good shape for passage by the House of Representatives at the next session of Congress.

The Hon. J. C. Pritchard and F. M. Simmons delivered able addresses in the Senate on behalf of this measure, and some excerpts have been taken from the addresses.

The district in which it is proposed to establish this reserve is distinctively a region of mountains and of steep mountain slopes. It has 46 peaks a mile or more apart, and 41 miles of dividing ridges, all of which rise over 6000 feet. It has nearly 300 additional peaks and 300 miles of dividing ridges which rise more than 5000 feet above the sea.

The hard-wood or broad-leaved forests had their beginning in this region; and owing to the great variety of soil and topographic and climatic features in this region we have there to-day the greatest variety of all forms of vegetation, and the most extensive remnants of the aboriginal or primeval hard-wood forests now left in North America. Here is to be found the mingling of the varieties which extend northward from the

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BY J. T. ROTHROCK.

OPEN GROUND FORM OF JERSEY, OR SCRUB PINE. (PINUS INOPS, AIT.).
MIFFLIN COUNTY, PENNSYLVANIA.

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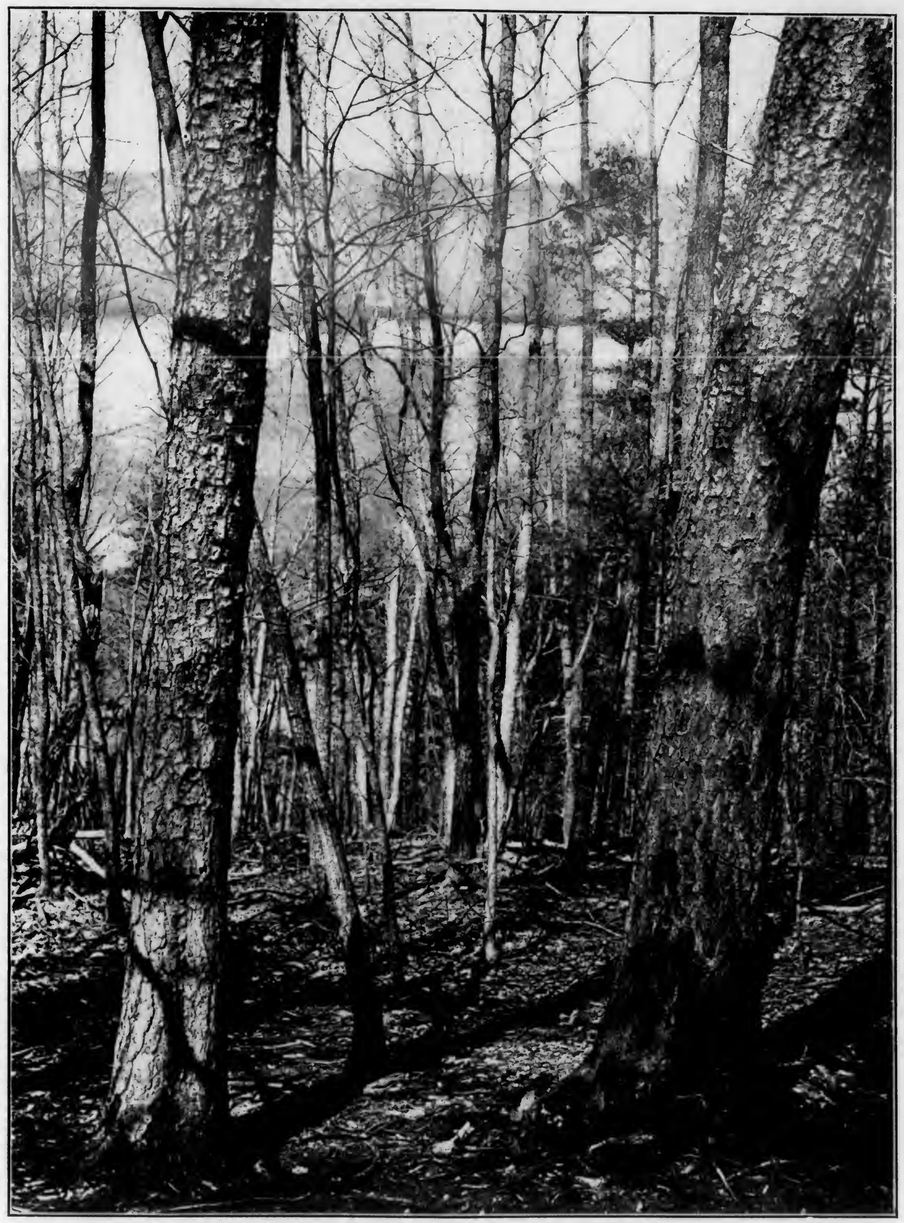
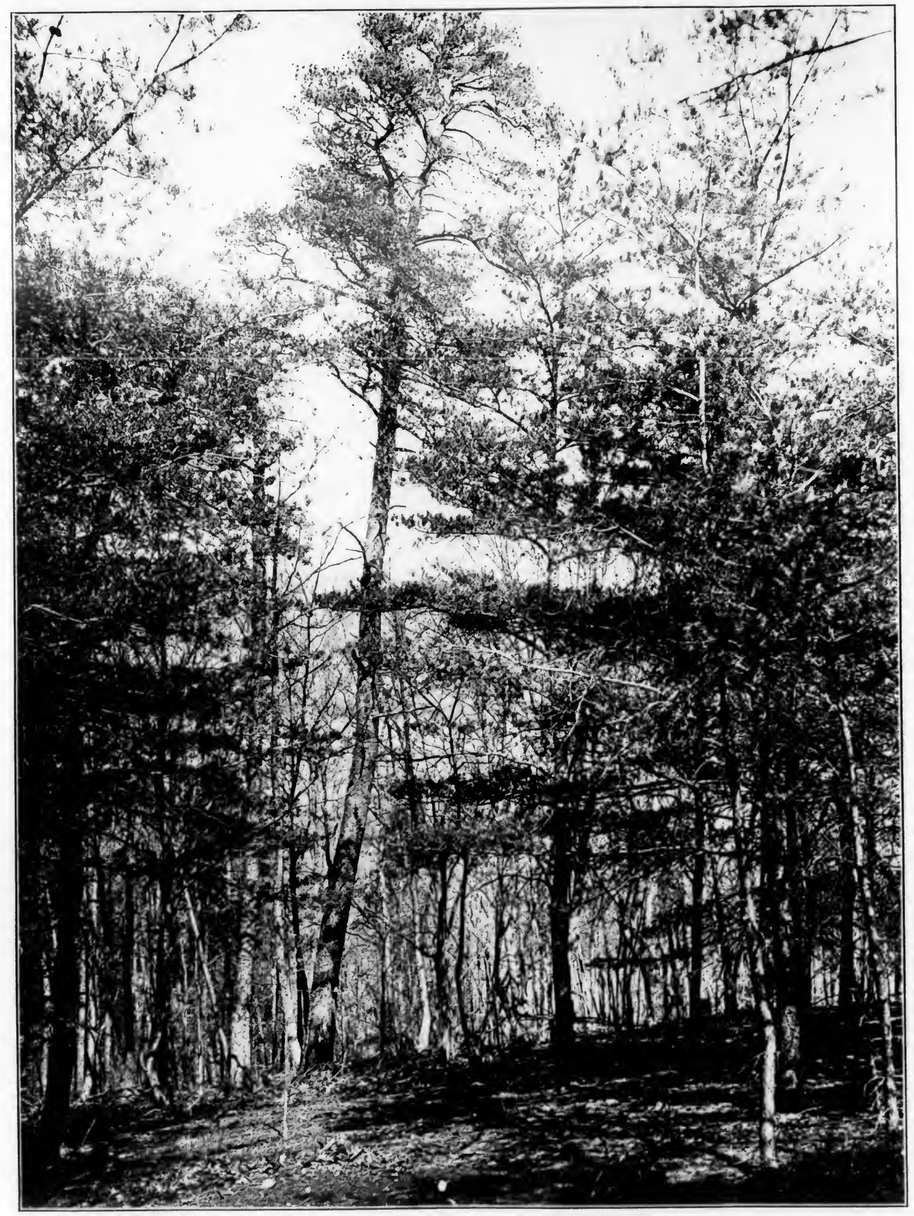
INTENTIONAL SECOND EXPOSURE

WOODLAND FORM OF JERSEY, OR SCRUB PINE. (PINUS INOPS, AIT.).
MIFFLIN COUNTY, PENNSYLVANIA.



TRUNKS OF JERSEY, OR SCRUB PINE. (PINUS INOPS, AIT.).
MIFFLIN COUNTY, PENNSYLVANIA.



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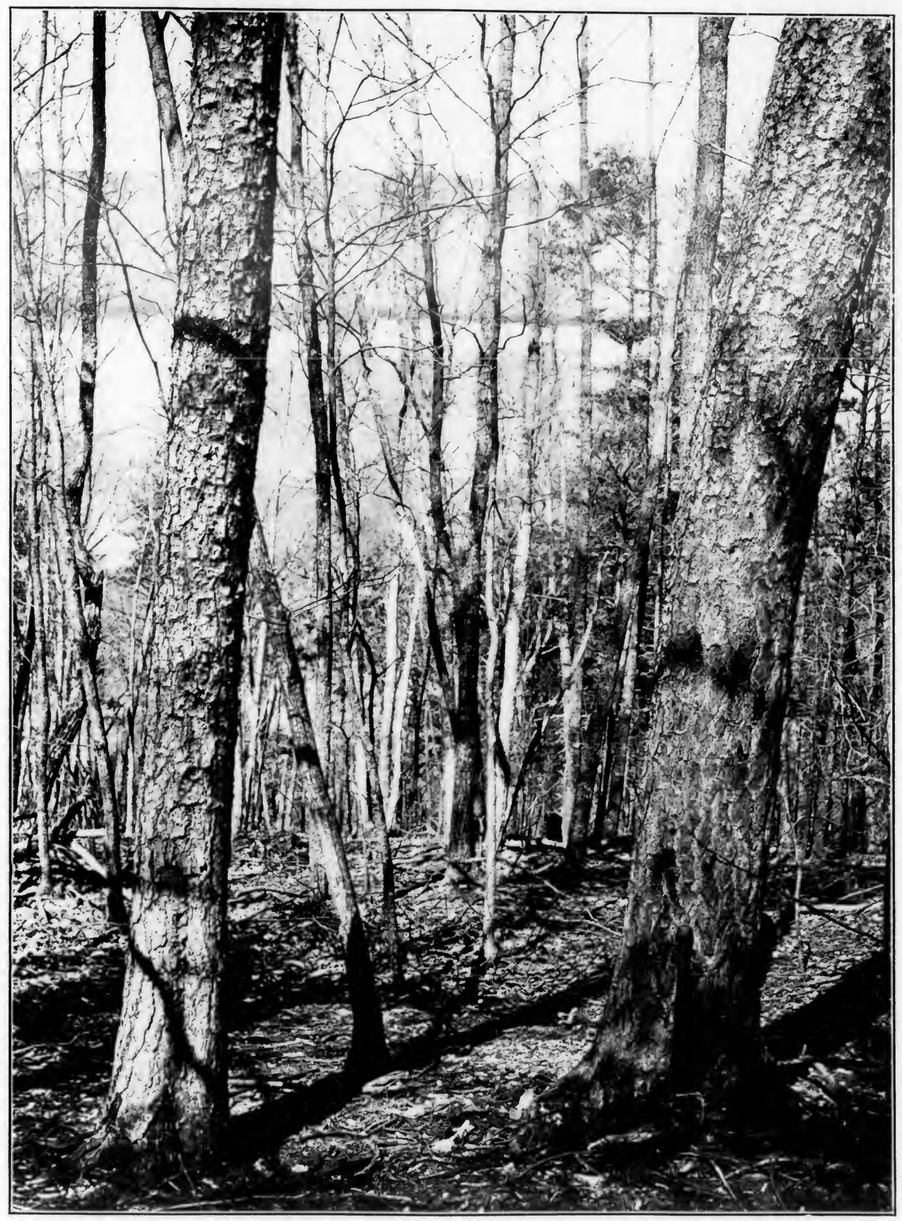

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Gulf States with those which have extended south from New England and Canada. The valleys of this region have nearly all been cleared of their forests and are now under cultivation. The ever-increasing demands for land to cultivate has resulted in clearings being made higher and higher up the mountain slopes, which in most instances have a pitch of from 20 to 30 or even more than 40 degrees. In many sections these clearings have actually reached the top of the mountains. It is estimated that about 24 per cent. of the area of this mountain region has been cleared, and the destruction of the mountain forests is increasing rapidly every year. The rapid increase in this clearing for agricultural purposes is due to the fact that these mountain fields are short lived, and unless sown in grass are usually limited to seven or eight crops at most.

The destruction of the forests of the mountain slopes has already resulted in increasing the frequency and violence of the mountain floods, and these are not only carrying away the soil on the hillsides, but at the same time are rapidly destroying the flat lands which lie in the narrow mountain valleys. During the past few years many thousand acres of these valleys have been actually washed away, and it is only a question of time, if this process continues, when all of the valley lands will have been damaged to such an extent as to render them valueless. Of the Southern Appalachian Mountain region as a whole, about 24 per cent. of area has been cleared of its forests, and is now either being used for agricultural purposes or has been abandoned. Leaving out the valleys and border lands, which have gentle slopes and which can safely be continued in a cleared condition and used for agricultural purposes, the remainder of the area is still to a much larger extent covered with forests, probably not more than 5 to 10 per cent. of the same having been cleared.

The damages from floods to the agricultural lands and other properties along the streams during the spring and summer of the year 1900 were estimated by the Secretary of Agriculture to have aggregated not less than $10,000,000.

It may be safely estimated that the damages from storms during the past twelve months along the rivers which rise in the Southern Appalachian mountain region have aggregated nearly $20,000,000, and it is perfectly safe to assume that if we are to continue the destruction of these mountain forests these floods in the future will also continue to increase both in their frequency and in their destructiveness.

In addition to the water-powers already developed (aggregating 60,000 H. P.) it is estimated that more than 1,000,000 H. P. is easily available; but the future value of this large additional power will depend largely upon the forests of this mountain region being perpetuated.

The purpose of the proposed forest reserve will be best accomplished:

First. By having the Government purchase, as far as may be possible, the existing forest-covered slopes in this region.

Second. The lands on the mountain slopes in this region from which the forests have already been cleared must be reforested under Government supervision as soon as practicable.

This is the first Government Forest Reserve asked for in the East, and differs from those in the West, which now have a total area of 52,339,432 acres, in the fact that the Government will purchase these lands from private persons, whereas in the West, with but one small exception, the forest reserves were established by the withdrawal of the forest lands from sale.

Maine's Timber Lands.

THE wild lands of Maine, which constitute about 43 per cent. of the area of the State, are the unincorporated lands. These lands are a great source of wealth to the State, and have been so recognized since this territory was first settled. The approximate value to-day is quoted at twenty millions of dollars.

Wild lands in Maine are located in eight counties—Oxford, Franklin, Somerset, Piscataquis, Aroostook, Penobscot, Hancock, and Washington. Aroostook, the largest county in the State, with an area of 6800 square miles, has approximately three million acres of wild lands. The timber varies. Hardwood ridges there are, with growths of spruce, cedar, and some pine. Piscataquis County has 3780 square miles of area, with 2,000,000 acres of wild lands. Somerset's unincorporated lands include about one and three-quarter million acres. The average of the remaining five counties is a half-million acres each. The total is approximately 9,400,000 acres.

The original surveys of these lands were very liberal. In the days when land was not worth very much, this statement was true of farms as well as of townships, and it is extremely difficult to ascertain accurate records of the acreage of wild lands.

In the land office at Augusta, reliable information of the acreage of large portions of wild lands is secured, because they are surveyed by the State and the records are kept there.

Years ago, when whole townships of land were

sold, practically the only valuation taken into account was the pine. In the days of hand-working solely, pine entered principally into the building of ships, as well as every form of house-finishing, while spruce was considered of little value. But in these days of improved machinery, as well as the pulp-mills, spruce has climbed steadily up the ladder of value, and, being used for almost every purpose, is becoming of more worth than almost any other wood.

Cedar, in great demand for shingles and railroad ties, is in Aroostook County, or wherever grown, for that matter, equal to spruce in value. Probably a larger growth of cedar exists in Aroostook than in any other section, although it is well scattered over the State.

This matter of ascertaining the value of wild lands for the purposes of taxation is much more difficult than similar work in towns and cities.

These unincorporated townships are largely uninhabited. It is not easy, you can imagine, to ascertain how much timber is in a township, or what is its value. There are many things to be considered. First, and most important, of course, is the amount of timber. Close second to this in importance are the driving waters or other facilities for getting the timber to the mills or manufactories as sold. In some counties are large quantities of timber—notably in the northwestern part of Aroostook, where the expense of cutting and getting the lumber to the mill is so great that there is little margin left of the timber as it stood on the stump.

The purchase of larger tracts of timber lands by paper manufacturers has opened a door to considerable information. When timber lands are offered for sale, and these corporations contemplate purchasing, they estimate the amount of different timber upon it, and the facilities for transportation. From the reports, and the price paid, an approximate valuation is ascertained.

Incidentally, the establishing of paper mills in Maine has greatly increased the value of the water power of the State. Paper mills, of course, require great water power, far beyond cotton or woolen mills, or indeed any other manufactory. As a result, all the most desirable water power of Maine is already secured, although in some cases not yet occupied, and the water privileges of the State were never worth so much as to-day.

Forest fires threaten the greatest danger to timber lands. This is particularly true in periods of drought, when a blaze destroys for a great many years the portions it devastates.

The timber growth in Maine will outlast this generation by many long years. The large cuts by lumbermen create alarm as the people read of their size. But there is one point they overlook. They entirely forget, in their calculations, that all this time every little tree in the State is steadily growing, day and night!

Cutting off is done judiciously in Maine. Some of the biggest lumber companies never allow a small tree to be ruthlessly cut down or mutilated. —*Lewiston* (Me.) *Journal.*

Production of Lumber in 1900.

THE Census Bureau has issued Bulletin No. 203, prepared by Mr. Henry Gannett, giving the statistics of the lumber industry in the year 1900, which shows an increase in the cut of lumber in the United States from 27,041,573 M. feet B. M. in 1890 to 35,084,166 M. feet B. M. in 1900, which would be quite satisfactory were it not for the fact that the rate of destruction of the forests is increasing. If we consider the logging camps we will find that in the year 1900 the total quantity of log stumpage cut was 25,928,940,000 feet B. M., which cost $56,439,474, while "other stumpage" (such as telegraph poles, railway ties, etc.) was estimated to cost $1,737,747. The value of the saw logs, etc., produced was $174,066,365. The discrepancy between the production of the logging camps, 26,000,000,000 feet B. M., and the saw-mills, 35,000,000,000 feet B. M., is accounted for by the failure of small concerns to report, and the difference between the scaling of logs in camp and the actual cut, the latter being the correct figure.

In order to show the value of the stumpage of the principal species of wood and amounts cut of each variety, a table was prepared, which is given below.

STUMPAGE—PRINCIPAL SPECIES FOR THE UNITED STATES: 1900.

SPECIES.	Quantity, M. Feet, B. M.	Value.	Average Value per M. Feet, B. M.
Yellow pine	7,886,388	$8,813,687	$1.12
White pine	5,241,016	19,156,206	3.66
Norway pine	53,365	153,700	2.88
Sugar pine	63,872	125,339	1.96
White oak	2,405,515	7,637,880	3.18
Cedar	618,073	814,934	1.32
Hemlock	2,418,147	6,200,834	2.56
Spruce	1,156,274	2,609,618	2.26
Chestnut	27,883	75,677	2.71
Elm	56,461	186,134	3.30
Ash	26,770	81,055	3.03
Basswood	8,990	13,480	1.50
Maple	282,219	750,005	2.66
Tamarack	31,151	31,051	1.00
Poplar	394,492	1,109,485	2.81
Cottonwood	291,750	423,350	1.45
Red gum	80,445	134,952	1.68
Red fir	1,986,364	1,536,574	0.77
Black walnut	200	1,000	5.00
Redwood	526,576	556,370	1.06
Cypress	450,128	712,302	1.58
Total	24,006,079	$51,123,633	$2.13

In Pennsylvania the average stumpage values per thousand feet B. M. were: White oak, $4.19; white pine, $3.69; hemlock, $2.75; and chestnut, $2.71.

The State of Pennsylvania ranked fourth in the value of lumber produced, viz., $35,749,965, being only exceeded by Wisconsin, Michigan and Minnesota. The total cut of timber in 1900 was 2,398,616,000 feet B. M., the amount of the different species being as follows:

	Feet B. M.
Hemlock	1,608,252,000
White Pine	238,021,000
Other Conifers	19,168,000
Chestnut	50,789,000
Oak	342,404,000
Other Hard-woods	140,282,000

Minnesota National Park.

BY the Morris bill which has passed both houses of Congress and is about ready for the President's signature, another vast National Park is provided and a valuable precedent is set for the control of the great timber regions of the Northwest.

Briefly, the bill sets apart forever a 25,000-acre tract of primeval forest on the islands of Leech and Cass Lakes as a National Park. It also preserves a forest territory of 830,000 acres from destruction by lumbermen. It regulates the cutting of timber on the lands which are to be sold for this purpose, limiting it to 95 per cent. of the merchantable pine. No other timber can be cut; which means that fully 50 per cent. of the forests will be left standing. The lumbermen must also clear up the refuse of their cutting in such a way as to prevent forest fires from assisting in the destruction of trees. The money secured by the sale of these timber lands will be held in trust by the Government for the Indians, who are the real owners of the territory.

In the district affected by this bill there are ninety-three lakes and seven rivers, including the headwaters of the great Mississippi. Travelers familiar with the region say that for fish, game and beauty of natural scenery it is not excelled anywhere in the world. It has an altitude of 1300 feet above sea-level, and nowhere is the air more health-giving or the water clearer.

But this is only the beginning of the good work. This vast forest region comprises 40,000 square miles, and it is hoped that within a few years this whole immense stretch of timber land will be controlled by the National Government, as the Morris bill now proposes to have the new National Park controlled.

President Roosevelt is known to have favored this project from the beginning. The success of the movement so far will encourage well-directed agitation to continue until it has been made the rule—and not, as now, the exception—for the National Government intelligently to protect and preserve what is left of the vast forests of the Northwest.

DURING a late business trip, opportunity was offered (as the following brief memoranda will suggest) to note the widespread interest in forest care and protection, and the crying necessity for these.

In Colorado, the mountains, whose elevations keep them snow-clad until midsummer, and often perennially, were almost bare. The last winter snows were so light or fell so late as to prevent them packing. As a consequence, Eastern Colorado faces a scarcity of water for irrigation, unless local storms are sufficiently numerous and heavy to meet the demands of growing crops. Colorado expects the irrigation legislation lately passed by Congress to encourage the erection of large storage reservoirs, and to aid in equalizing the stream flow. Although there is growing appreciation of the injury due to forest fires, these are far too prevalent, and on the Continental divide we saw columns of smoke resulting from forest fires of considerable extent.

The deficiency of stream flow has encouraged action by the State of Kansas to limit the utilization of water in Colorado which is now employed to the supposed injury of farmers in the former State, and this contention has come before the U. S. Supreme Court.

In Kansas City the penalty of the law was being enforced against owners of horses who damaged sidewalk trees by nibbling at the bark.

In Chicago, the press voiced public approval of the forest reservations of 25,000 acres on the Islands of Leech and Cass Lakes, Minnesota, as a National Park, and the regulation of lumbering on 830,000 additional acres, the editorials favoring the reservation of 40,000 square miles near the headwaters of the Mississippi River.

In fact, all over the country forestry is attracting attention in one way or another. J. B.

The special summer meeting of the American Forestry Association will be held August 27–28, at Lansing, Mich. There will be an excursion from Lansing to Mackinac and return August 28–Sept. 1st.

New Members of the Pennsylvania Forestry Association.

SINCE the February, 1902, issue of FOREST LEAVES, the following persons have united with the Pennsylvania Forestry Association:

Allen, William N., 557 Church Lane, G't'n, Phila., Pa.
Antrim, H. Carlton, 5021 Penn St., F'k'd, Phila., Pa.
Appel, Mrs. William N., 419 E. King St., Lancaster, Pa.
Aucker, R. S., Shamokin, Pa.
Baer, Miss Helen B., 1501 Mineral Spring Road, Reading, Pa.
Behrend, Ernst R., Erie, Pa.
Bemis, H. C., Bradford, Pa.
Benson, Mrs. Louis F., 1904 Chestnut St., Phila., Pa.
Biddle, Caldwell K., 1420 Walnut St., Phila., Pa.
Bierer, E. D., Point Marion, Fayette Co., Pa.
Brady, Franklin, M. D., 1815 Frankford Ave., Philadelphia, Pa.
Brazier, Joseph H., 1803 Pine St., Philadelphia, Pa.
Brock, Arthur, 2101 Spruce St., Philadelphia, Pa.
Brock, Mrs. Robert C. H., 1612 Walnut St., Philadelphia, Pa.
Brown, John A., Devon, Pa.
Brown, Mrs. John A., Devon, Pa.
Brown, Percy, 216½ Main St., Houston, Texas.
Brubaker, R. H., Lancaster, Pa.
Buchanan, R. Geo., 724 Drexel Bldg., Phila., Pa.
Bull, John W., "Friendship Hill, New Geneva, Pa.
Chandler, Percy M., 6th and Chestnut Sts., Phila., Pa.
Choate, Mrs. John N., W. High St., Carlisle, Pa.
Christy, Bayard H., Pittsburgh, Pa.
Church, Arthur L., 500 N. Broad St., Philadelphia, Pa.
Clapp, B. Frank, 210 W. Washington Sq., Phila., Pa.
Clark, Judson F., 45 "E" Ave., Ithaca, N. Y.
Correll, James W., Easton, Pa.
Curtis, Lewis A., Southport, Conn.
Davies, John C., Johnstown, Pa.
Donohugh, Miss E. E., Shawmont Ave., Roxborough, Phila., Pa.
Doughty, Mrs. Alla, Halcyone Cottage, Milford, Pa.
Downs, Mrs. Norton, 215 W. Walnut Lane, G't'n, Philadelphia, Pa.
Dunlap, Frederick, 411 Huestis St., Ithaca, N. Y.
Earle, Mrs. James M., Chestnut Hill, Philadelphia, Pa.
Eberle, Louis, 623 N. Front St., Pottsville, Pa.
Farquhar, A. B., York, Pa.
Flanigen, Miss Lucille, 2120 Spruce St., Phila., Pa.
FonDersmith, Mrs. Charles A., 540 N. Duke St., Lancaster, Pa.
Foote, W. Burton, Elkland, Tioga Co., Pa.
Garrett, Albin, Westtown, Pa.
Givler, A. C., Carlisle, Pa.
Givler, Mrs. A. C., Carlisle, Pa.
Godfrey, Jonathan, 486 Washington Ave., Bridgeport, Conn.
Grant, Mrs. John B., Douglassville, Pa.
Griscom, Mrs. C. A., Haverford, Pa.
Gummere, Mrs. Francis B., Haverford, Pa.
Hancock, J. C., 3722 Chestnut St., Philadelphia, Pa.
Hay, Mrs. James, 1808 Spring Garden St., Phila., Pa.
Henkle, E. A., 3338 N. 16th St., Philadelphia, Pa.
Hogg, J. Renwick, 1220 Market St., Philadelphia, Pa.
Hogg, Wm. A. Uniontown, Pa.
Hoopes, Mrs. Dawson, Chestnut Hill, Philadelphia, Pa.
Janney, Robert M., 112 Drexel Bldg., Philadelphia, Pa.
Jenks, Horace H., 920 Clinton St., Philadelphia, Pa.
Johnson, Lewis E., Steelton, Pa.
Kauffman, P. P., 129 N. Queen St., Lancaster, Pa.
Keen, Harry R., Rutledge, Pa.
Kemble, Mrs. Clay, Laverock, Pa.
Kessler, Joseph W., Shamokin, Pa.
King, Mrs. Charles R., Andalusia, Pa.
Kisner, Elliot P., Hazleton, Pa.
Küsel, Geo. C., M.D., 1831 Chestnut St., Phila., Pa.
Lewis, Theo. J., 1103 Harrison Bldg., Phila., Pa.
Lindner, John, Carlisle, Pa.
Lindsay, Frank, Chambersburg, Pa.
McCarthy, J. A., Glenside, Pa.
McClintock, Norman, Amberson Ave., Pittsburgh, Pa.
McCormick, Robert, Box 548, Harrisburg, Pa.
McDougal, Geo., 4343 Baltimore Ave. Phila., Pa.
McInnes, Walter S., 1420 Chestnut St., Phila., Pa.
McLean, W. L., Queen Lane, G't'n, Philadelphia, Pa.
McMahon, Miss Laura V., Belmont and Monument Aves., Philadelphia, Pa.
McMaster, James S., 1329 Arrott St., F'k'd, Phila., Pa.
Meehan, J. Franklin, Dorset St., near Boyer, G't'n, Philadelphia, Pa.
Newbold, Mrs. A. E., Laverock, Pa.
Newhall, Miss Abby, 4048 Spruce St., Phila., Pa.
Newhall, Miss Mary, 4048 Spruce St., Phila., Pa.
North, Hugh M., Jr., Columbia, Pa.
Paul, James W., Jr., 3809 Locust St., Phila., Pa.
Paxson, Charles, 306 Drexel Bldg., Philadelphia, Pa.
Plank, Mrs. John W., E. High St., Carlisle, Pa.
Pott, Miss Emma, 433 S. Center St., Pottsville, Pa.
Rau, Wm. H., 1324 Chestnut St., Philadelphia, Pa.
Reeves, Ellis B., Phœnixville, Pa.
Richardson, Mrs. Charles, 1307 Spruce St., Phila., Pa.
Roach, Mrs. John B., Chester, Pa.
Rodgers, Isaac H., 1205 Arrott St., F'k'd, Phila., Pa.
Ryder, Mrs. E. D., "Ardornish," Dingman's Ferry, Pa.
Schropp, Mrs. Abraham S., Bethlehem, Pa.
Simpson, Miss Mary A., Belmont and Monument Aves., Philadelphia, Pa.
Smith, Miss Eugenia Hornor, 2121 Pine St., Phila., Pa.
Smith, J. L., 27 S. Sixth St., Philadelphia, Pa.
Snowden, C. L., Brownsville, Pa.
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Woodin, C. R., "The Heights," Berwick, Pa.

The railroads of the United States make great and increasing demands upon our forests for ties and telegraph poles. According to the report of the Twelfth Census the total number of ties cut in the year 1900 was 22,591,894, and 937,963 telegraph poles. Of this total the State of Pennsylvania supplied 1,394,500 ties and 32,637 telegraph poles.

New Publications.

Ressources Végétales des Colonies Françaises. Minister of Colonies, Paris, France. Quarto, 160 pages. This catalogue was prepared by Dr. Gustav Neiderlein, Chief of the Scientific Department of the Philadelphia Museums, and gives a list of all the different plants of the French Colonies, divided according to their uses, giving the botanical and common names, colony, and also the museum number, representing the collection of the Colonial Office at the Paris Exposition, and forms a valuable reference book in regard to the plant life found in the dependencies of France. In addition, there are short lists of the various animals, minerals, archeological and ethnological objects.

Special Report of Capt. George P. Ahern, in charge of Forestry Bureau, Philippine Islands. War Department, Washington, D. C. 8 vo., 60 pages. In this report Capt. Ahern gives a synopsis of the operations of the Forestry Bureau from April, 1900, to July 30, 1901. A history of the Forestry Bureau is given from its organization in April, 1900, the form of licenses issued for the cutting of timber, prices of woods in the six groups, rules and regulations in regard to cutting timber, names of woods in the six groups, together with recommendations for the improvement of the service, are given. The report shows that under the Spanish régime a good forestry system was inaugurated in 1863, but was not enforced, and the good points of this system have been adopted by the present Bureau. There was collected on forest products from public lands in the Philippine Islands from July 1, 1900, to June 30, 1901, $199,373.11 (Mexican)—certainly a good beginning. The report closes with 33 pages of fine illustrations of forest and lumbering scenes.

Annual Report of the Director of Forestry for the Province of Ontario, 1900-1901. 8 vo., 64 pages, In his annual report, Mr. Thomas Southworth, Director of Forestry, mentions the condition and management of the forest reserves, together with suggestions as to the proper course to be pursued in other sections of the Province having similar characteristics. The subject of the denudation of the older portion of the province has been investigated in detail by counties and townships, showing that the proportion of wooded to cleared land is steadily decreasing and the danger becoming apparent. Mr. J. A. DeCew contributed a paper on "The Production of Tannin in Ontario," and W. T. Hutt an article on "Management of the Farmer's Woodlot." A résumé is also given of the laws in some of our own States framed to encourage reforestration.

The Fourteenth Annual Report of City Parks Association of Philadelphia is received. It comes down to and includes the current year to May 1st. This report is well illustrated, and it will, no doubt, be a surprise to thousands that such scenery is still found unappreciated within the city limits. Formation of parks is not forestry; but it is closely enough allied to it to awaken among all who are friends of the forestry movement a feeling of genuine sympathy for the work of the City Parks Association. Indeed, the membership of the two associations is very closely allied.

The work so well started should go on; the Parks Association need not languish for want of work for many a year.

A Working Plan for Forest Lands Near Pine Bluff, Arkansas. By Frederick E. Olmsted. 8vo, 48 pages. Illustrated. Bulletin 32, Bureau of Forestry, U. S. Department of Agriculture, Washington, D. C.

In this Bulletin Mr. Olmsted gives the results of his investigations to determine whether the tract of land of the Sawyer & Austin Lumber Company, comprising 105,000 acres, was large enough to furnish a sustained yield equal to the yearly capacity of the mill—40,000,000 feet, B. M.,—and, if not, to estimate the additional area necessary to secure such result. About 85 per cent. of the total area is pine land, covered with the shortleaf and loblolly pine, the balance of the land being hardwood. The "valuation surveys" covered about 1900 acres. It was found that if all the pine lumber was cut above a diameter of 12 in. breast high, and 20 in. in diameter for the hardwoods on the bottom lands, a cut equal to the present could be obained again in 42 years, if the fire was kept out; and if 170,000 acres of forest land similar in character were added, the sustained annual yield would equal the capacity of the mill.

Diagrams have been prepared of the average diameter growth, also the height growth of the shortleaf and loblolly pine, on the basis of age, the number of pine trees per acre, etc., while illustrations show the character of the timber, the effect of lumbering, forest fires, etc.

The Timber Resources of Nebraska. By Wm. L. Hall, Superintendent of Tree Planting, Bureau of Forestry, Department of Agriculture. Pamphlet of 16 pages. Illustrated. This reprint from the 1901 Report of the Department of Agriculture gives an interesting account of the increase of timberland in Nebraska. Originally but about 3 per cent. of the area of the State was wooded; but, since the settlement of the State, some 200,000 acres have been planted with trees,

and, in addition, the original forest seems to be gaining new ground. The plates show examples of native and planted forest growth, as well as views of the sand-hills in the northern portion of the State, which are at present of no value, but which, if planted with trees such as were used in the experimental test in Holt County in 1890, might be clothed with timber.

Southern Wild Flowers and Trees, by Alice Lounsberry. xxxi + 570 pp. Illustrated by Mrs. Ellis Rowan. New York, 1901, Fredk. A. Stokes Co. Price, $2.50.

Miss Lounsberry's latest book on "Southern Wild Flowers and Trees" has 16 colored and 161 black and white plates, and 88 vignettes and diagrams by Mrs. Ellis Rowan. Of the black and white plates, 16 are from wash drawings made to commemorate trips to different places. In these Mrs. Rowan has brought in an atmosphere far beyond that in reproductions from photographs, the outlined scenery standing out free from the confused detail due to the use of the camera. A poetical yet practical introduction is written by Chauncey D. Beadle of the Biltmore Herbarium, and the author has added a key to the families described, as well as separate indices for the English and Latin names.

In the text Miss Lounsberry has treated the subject in a popular way, while making sure that the nomenclature is modern. Nothing seems to have escaped her, from interesting reminiscences of the visits of the elder botanists who went through the mountains, to the presence of certain trees and shrubs in the Arnold Arboretum. She has gathered information as to the use the Indians made of some of the plants named, and native lore concerning them, or a statement regarding their use here or elsewhere, whether as medicine or to make implements, frequently their Old World history, or comparison with Old World plants, becoming part of the description. In this connection are many tales connected with the Revolution and the war of 1861–65, and references to the mythology of the ancients. To botanists, one of the greatest attractions of the book will be the careful descriptions of exact localities in which plants may be found. Miss Lounsberry is not satisfied with saying "in damp, rich woods," or "low grounds," but specializes, as "under rhododendrons," "about old trees," "on rocky ledges," etc. To bare descriptions of trees and plants are added notes in regard to the appearance of these when in bud, or during other seasons than that of flowering, the color of the bark and young leaves, and many other striking peculiarities. The writer has introduced enough of narrative to carry one with her along the highways, the methods of conveyance, the quaint sayings of the natives, and many other items of interest appealing to the general reader. The descriptions themselves lead one by easy gradations from the palms of Florida to the sub-arctic plants of the higher mountains of North Carolina and Tennessee. The pine, with its history and commercial uses, the "he- and she-balsam," and the hemlocks, the cypresses and cedars, take up the first part of the book.

As much more space is given to the palms and Florida moss, followed by the water hyacinth and a narrative of the troubles it has caused in the St. John's River.

The pinks and lilies, colic-root and smilax, orchids, columbines and anemones, violets and roses, receive delicate attention, along with the walnuts and hickories, the willows and poplars, birches, chestnuts and oaks, leaving one with the feeling that here, if anywhere, are forest conditions not to be disturbed. One who has not visited the Southern country realizes for the first time how many cultivated and curious plants have come from this region, where the sweet strawberry shrub, the lilac-purple Catawba rhododendron, the hydrangeas, American camelias, azaleas, painted cups, morning-glories, galax and heart-leaf fail to hold attention because of so many beautiful native flowers and majestic trees still remaining to attract the ever-wandering eye. The book should be in the hands of every lover of flowers, and cannot fail to educate its owners to the importance of agitating without cessation for Government ownership, and the establishing of the first National Park in the East.

WILLIAM L. SHERWOOD,
President New York Naturalists' Club.

Mrs. Choate, of Carlisle, writes that "Last year, before Arbor Day, the Civic Club of that city offered prizes of $3, $2 and $1 for the best tree at one year.

"As a result of this offer, 330 trees were planted by the school children.

"About June 1st committees visited all these trees and selected the best. These numbered 47, and a committee of three, whose knowledge of trees made them capable judges, inspected these 47 trees and awarded the prizes. So many were good that it was deemed advisable to divide the prizes, and six children were made happy, instead of three.

"This was an experiment, and of course we have learned something to help in the work next year; but it has also awakened in some of the children an interest in tree planting which can be turned to good account."

F. R. MEIER,

Consulting Forester,

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

AT a late meeting of the Council of the Pennsylvania Forestry Association the number of historic or unusually large trees in the vicinity of Philadelphia came up for discussion. Believing that this subject would interest the readers of FOREST LEAVES, the editor will be pleased to receive memoranda concerning trees of notable size or of peculiar forms, or those of interest historically. It is not our intention to limit these descriptions to any locality, but, in the expectation that a compilation would embrace many interesting features, we invite the coöperation of our readers. In sending memoranda concerning specific trees, our friends are requested to state locality, kind of tree, and any facts of special moment. When circumferences are given, it is particularly desirable to have these taken with exactness, and the distance above ground at which measurements are taken should also be noted. As a general rule, it may be well to suggest that circumferential measurements if taken 3 or 4 feet above the ground will probably be most equitable.—J. B.

* * * * *

It is pleasant to welcome a newcomer.

"*The Proceedings of the Iowa Park and Forestry Association*" at its first Annual Meeting, held in Des Moines, Iowa, Dec. 10, and 11, 1901, is here.

That society bids fair to become a vigorous member in the company which is battling for forest and park—utility and beauty in the land.

The report is an 8vo. of 80 pages, and is well printed and liberally illustrated.

One sentence, p. 51, shows that the Society was not organized any too soon—"Iowa is wholly without forestry laws." Truly an alarming state of affairs. We hope this new society will do its work so well that Iowa may soon lay claim to being numbered with the States that are most progressive in forestry matters.—J. T. R.

From the far northwest come tragic stories of great damage, accompanied by the destruction of homes and loss of life, the result of conflagrations raging in the forests of Washington and Oregon. Those who have seen the superb trees of these States, and especially those who have witnessed fire sweeping through them, can appreciate something of the loss which follows a forest fire there. But who is responsible for the loss, which, as we write, is quoted as one million of dollars? Either carelessness or design evidently caused this great damage. We emphasize design because a decade ago the writer saw magnificent cedars and firs, covering a large area, burning, as the result of an effort to clear the site of a prospective town which is to-day merely a hamlet.—J. B.

* * * * *

The growing interest in forestry and arboriculture is evidenced by the creation of additional forest reserves, the formation of the International Society of Arboriculture, the large number of forestry meetings, and the proposed issuance of new forestry journals.

We welcome all these efforts, and will expect good to follow the wider dissemination of knowledge as to forestry and arboriculture, but we question whether the demand for special literature is yet sufficiently great to warrant all of the projected additions. However, we promise to each the cordial coöperation of Forest Leaves in advancing all well-matured efforts to attract interest to the forestry movement.—J. B.

* * * * *

Forestry is rapidly securing such a hold upon the public that its champions need to keep in mind the dangers menacing any movement which commands popular favor. Among the dangers to be apprehended is the encouragement which will be given to those who would use such movements in the interests of political factions or parties. The efforts to preserve and protect our forests have so far been free from "politics," as we use the word in this country, and they should be so maintained. The enrollment of citizens of such high character as make up the lists of the names of forestry associations is an inviting constituency, and the reservation of forested areas which require caretakers suggests the danger of having these offices become perquisites of those in political power.

Possibly the best solution of the latter problem is to make the work sufficiently arduous, and the pay so uninviting, that there is little to encourage the importunities of the army of men who are always on the lookout for some one to nurse them into positions, rather than to make places for themselves by individual effort. There should be no room in the administration of the forestry bureaus, national or State, for sinecures.—J. B.

Autumn Arbor Day.

DR. NATHAN C. SCHAEFFER, Superintendent of Public Instruction of Pennsylvania, has issued his Fall Arbor day announcement, the text of which is as follows:

Trees can be planted in the fall as well as in the spring. Hence, it has become customary for many schools to celebrate Autumn Arbor Day, in addition to the Arbor Days which the Governor annually designates by proclamation in the spring of the year. For rural schools closing before the middle of April, the Autumn Arbor day is the only day which they can observe.

In accordance with this custom, Friday, October 17, 1902, is hereby named as Autumn Arbor Day, and the directors, teachers and pupils of our Public Schools are requested to observe the day by planting trees and other suitable exercises. The story of trees famous in history may be told. The value of trees for utility and adornment, the effect of forests in retaining and distributing rainfall, and the forestry movement, under which half a million acres have been purchased by the State and set apart as a public reservation, may be profitably discussed. The career now opening up to young men who make forestry a profession should be pointed out. But, above all else, the pupils should be taught by actual experience how to plant trees, how to promote their growth, and how to protect them from noxious insects and other enemies. Nathan C. Schaeffer,

Superintendent of Public Instruction.

Prof. John Gifford, of Cornell Forestry School, writes as follows about the Jersey scrub pine: "I was very much interested in your article on *Pinus Virginiana* in last issue of Forest Leaves. In Burlington county, New Jersey, about Mount Holly and Moorestown, one often sees this pine in wood lots growing to be quite fine in quality and size. I was surprised to hear it so well spoken of. It is commonly used for the frames of dwellings. Two years ago, in Germany, the seed dealers all asked eagerly for the seed of this tree, since they thought it would do so well on extremely poor soil. The wood is quite good on the loamy soil of our marl region. I went to Florida last winter and I thought the pine there must be the same, because it looked enough like the Jersey scrub to be the same. I see, however, that Chapman, in his botany of the South, makes *Pinus clausa* a variety of *Pinus Virginiana*."

Rules for Pennsylvania's Forest Reservations.

THE following Resolutions were adopted by the State Forestry Reservation Commission, at its meeting on August 7, 1902:

Resolved, That the State Forestry Reservation Commission, which is charged by the act creating the Department of Forestry with the care of the State Forestry Reservations and is empowered also to make rules for the government of the same, desires to open these reservations, so far as is compatible with proper protection to State property, to every citizen of the Commonwealth, for rest, camping and lawful hunting and fishing, and for the still more important purpose of restoration to health of those who are in need of an outing. Governor Stone has well said that these reservations belong to the people of the State and are to be considered as their outing grounds.

Resolved, That while the Forestry Commission will encourage all lawful use of the reservations, it will use all its authority to suppress any unlawful use of the ground, and to this end will instruct the State reservation superintendents, wardens, guards and detectives to remove immediately all parties who take deer-running dogs on the ground, to kill the same when found in pursuit of deer and to remove all parties from the State lands who do not properly guard their camp or other fires, so as to prevent destruction of State property by starting general forest fires.

Resolved, That making fires by hunters who are standing on deer or other "runways" is positively forbidden.

Resolved, That it shall be considered a standing order to all forest officers, who may be charged with the execution of these resolutions, to immediately summon a constable and arrest those who are in violation of laws or regulations providing for the safety of the State Forestry Reservations—as is provided for by the act of April 29, 1897, P. L. 29, entitled "An act to authorize constables and other peace officers, without first procuring a warrant, to arrest persons reasonably suspected by them of offending against the laws protecting timber lands."

Resolved, That every forest officer of the State be notified that he is to afford all proper facilities to parties camping on State lands, so long as said campers respect and protect the property of the Commonwealth, and that said law-abiding campers shall have the right to move their camp from point to point, on said reservations, without hindrance from any State forest officer.

By order of the Forestry Commission,

J. T. Rothrock, *President.*

Some Famous Washington, D. C., Trees.

THERE are many trees in Washington whose title to one's attention is founded in the memories they preserve. Some of these trees are distinguished by descent; some are historic by reason of the hand that planted them; some are of interest as living monuments to dead men. Memorial trees in the strict sense—in the sense of having been planted in memoriam of someone who was a man—are rare.

The United States Botanic Garden has more than once been called a historic grove. Its walks are shaded with trees that have power to recall to minds of Americans many chapters of the great republic's history. Standing at the left of the east gate is a mossy over-cup oak called the Crittenden oak.

This oak was planted by that great statesman, John J. Crittenden of Kentucky, to commemorate his grand but unsuccessful efforts for peace between the North and South.

A few feet to the south of the Crittenden oak stands an American elm, whose parent grew in the District of Columbia before the removal of the national capital from Philadelphia, and which is descended from George Washington. At about the time of the laying of the corner-stone of the Capitol, on September 18, 1793, George Washington planted an elm. That tree survived till killed by workmen to make way for the architectural terrace which superseded the rural terrace. The Washington tree in the Botanic Garden was propagated from roots of the elm planted in the Capitol grounds by Washington. The latter tree was planted where it grows now, by Senator James B. Beck of Kentucky.

A big Monterey cypress grows near the east end of the greenhouse and to the south of the main walk. The seed from which the tree was grown was given to the superintendent of the garden by Mrs. Jefferson Davis during her husband's official residence at Washington. The Monterey cypress is a variety of that deciduous family which was discovered in the mountains of the trans Mississippi region by Government parties of explorers looking for a practicable route for a transcontinental railway. It is a tree which closely resembles the Japanese cypress and the arbor vitæ.

There are at the south front of the central greenhouse two specimens of the bald variety of cypress which are called "Forney" and "Forrest." One was planted by John W. Forney, journalist, and the other by Edwin Forrest, actor.

Not far away is a Chinese tree grown from seed from a tree at the grave of Confucius, presented to the garden by the late Charles A. Dana and

planted by Representative Amos Cummings of New York fifteen years ago.

One of the parent Oriental planes grows at the west end of the garden. Its seed came from a plane tree that grew in the Vale of Cashmere, and it was planted by Thaddeus Stevens.

Close by the parent plane are an English oak planted by Mr. Bayard of Delaware while American ambassador to the court of St. James, a European oak (*Quercus dentacus*) planted by Proctor Knott at about the time of his speech in derision of Duluth, an American oak planted by Senator Conger of Michigan, a cut-leaved Oriental sycamore planted by Daniel Voorhees while a senator from Indiana, a rock elm planted by Stoddard Johnson of Kentucky, a Japanese god tree and a *Magnolia conspicua* planted a number of years ago by Senator J. C. S. Blackburn, an American oak from an acorn gathered and planted by Rutherford B. Hayes while President of the United States, and a European linden planted by Major Roxie.

On the main walk somewhat west of the greenhouse are two winged elms thirty years old, one of which was planted by Lot M. Morrill of Maine, and the other by Justin S. Morrill of Vermont.

The Holman tree, a Crimean fir, planted by Representative Holman of Indiana, grows near the west end of the greenhouse and south of the main walk, and hard by it is an Irish yew. Along the main walls is a young horse chestnut, planted in place of one set by Senator Vance of North Carolina, which was broken down by wind two or three years ago. Nearby is a linden, in memory of Representative Singleton of Mississippi; an Austrian maple, set by the North Carolina delegation in Congress ten years ago, and an evergreen tree in remembrance of the works of Allen Ramsey, the Scotch poet, and which was grown from seed from a tree in a vale near Edinburgh, celebrated by Ramsey in his "Gentle Shepherd."

Two features of the garden are a pair of Lebanon cedars, one planted by Senator Hoar and the other by Senator Evarts. The seeds from which these trees were grown came from the Holy Land, and the type of tree has, it is believed by botanists, undergone no change since Scriptural times.

At the east end of the garden, and not far from the Crittenden oak, is the Beck elm, planted by Senator Beck of Kentucky. Scattered about the grounds are trees set by Representatives Littlefield of Maine, McCall of Massachusetts and Davidson of Florida, by Senator Frye and John Sherman. One of the youngest trees, the baby of the grove, is a little oak set out by James Wilson, Secretary of Agriculture.

At the south front of the extra tropical greenhouse is a hackberry planted by Francis P. Blair. In the southeast corner of the garden is a little live oak set by Governor Sayers of Texas. There is also a young tree known in the garden as "Senator Jones of Arkansas."

Forming the north angle of a triangle with the Crittenden and Beck trees is one planted by Mr. Smith in honor of Alexander R. Shepherd.

There stands in the southern part of the garden a descendant of the Sumner tree, which was one of the beauties of the Capitol grounds years ago. It is called the Sumner-Bingham tree, a handsome specimen of hornbeam. During certain improvements in the Capitol grounds the destruction of a magnificent hornbeam which grew but a stone's throw from the Senate wing was contemplated by the landscape architect. A magnificent plea for the life of this tree was made in the Senate by Charles Sumner. The plea prevailed, and the improvement plans were so modified as to avoid, it was thought, the sacrifice of the hornbeam. But the soil near it was disturbed, or its roots were exposed, or too many of them cut, and the Sumner hornbeam died. A tree was propagated from the roots, and twenty-five years ago the little sapling was set in the Botanic Garden by John A. Bingham, Sumner's friend.

The Albert Pike acacia, planted by that exalted Mason twenty years ago, rises above the extra tropical green house at the south front, and across the walk to the east of it is a rather small acacia which was propagated from a sprig taken from a wreath of acacia sent by Masons and which rested on the bier of James A. Garfield. The acacia tree is sacred in Free Masonry.

A curious tree with a vast progeny in various parts of the country is the Botanic Garden hybrid walnut, which grows at the south end of the greenhouse. It is an accidental hybrid.

The Cameron elm is one of the best known Washington trees. It grows at the entrance of the Capitol terrace at the southeast corner and obstructs the way. It was because of this that the architect decreed the stately elm should be destroyed. Senator Don Cameron made a plea for its preservation, just as Sumner had done in behalf of the hornbeam, and the tree was saved. It is vigorous and is in foliage.—*Washington Star.*

Professor Sargent says that the strongest wood in America is the hickory of Arkansas and the weakest the West India birch.

The Utilization of Waste Timber Products.

MR H. G. KITTREDGE has prepared for the Census Office a Bulletin on "The Utilization of Wastes and By-products;" showing the great advance which has been made in late years in the use of materials formerly considered of no value, from which some of the items relating to forest products have been excerpted.

Nearly all of the formerly waste products of lumber and timber are now turned to some utility, and some of the new products thus formed are of considerable value. Of this latter class may be mentioned sawdust, which was formerly considered an absolute waste material, and was allowed to float down the stream or was thrown into a heap where it could be most conveniently disposed of. French cabinetmakers have found a way of preparing this material which gives it a value far above that of solid timber by a process that has been in vogue for at least twenty-five or thirty years, combining the use of the hydraulic press and the application of intense heat. By this process the particles of sawdust are formed into a solid mass capable of being molded into any shape and of receiving a brilliant polish, and possessing a durability and a beauty of appearance not found in ebony, rosewood, or mahogany. This product is know as "Bois durci." Artificial woodwork therefore seems to have a promising future. Alum, glue, and sawdust, kneaded with boiling water into a dough, and pressed into molds when dried, is hard and capable of taking on a fine polish. Ornaments of great beauty can be made from it very closely resembling carved woodwork.

The production of acetic acid, wood naphtha, and tar from sawdust is one of the latest enterprises in Norway. A factory has been started at Fredrikstad capable of distilling 10,000 tons of sawdust in a year. It also manufactures charcoal briquettes, which are exported to the Netherlands. The acids are chiefly placed on the German market, while the tar is mostly consumed at home. The factory is said to be the first of its kind erected in that country. According to an English patent of 1897, sawdust may be so prepared as to be noninflammable, and then applied to jacketing of boilers and other purposes.

In the Journal of the Society of Chemical Industry, for 1898, is described a series of experiments for obtaining alcohol from either coarse or fine sawdust, without affecting the yield. It was found that pine sawdust as compared with fir sawdust was superior as yielding a purer alcohol. It was also found that a high yield of sugar was obtained from birch sawdust, the yield of sugar being about 30.8 per cent of the quantity of birch wood used. The quantity of the alcohol obtained from 220 pounds of air-dried sawdust (20 per cent. water) was 7 to 8 quarts. The quality of the alcohol distilled from the fermented liquid was said to have been excellent, and the preliminary experiments indicated that the trifling impurities found in it could be readily removed.

A patent taken out in England in 1896 for utilizing certain waste products of wood describes a process of constructing or manufacturing a product resembling wood, from a mixture of sawdust or wood refuse and certain quantities of gums, resins, or other suitable agglutinants, either in a dry state or dissolved, the compound being subjected to pressure at a temperature sufficiently high to soften or melt the gums or resins.

According to the United States census of 1900 the amount of sawdust used in the clay and pottery industry of this country cost $19,687, or 0.17 per cent. of the total cost of all the raw materials used.

The utilization of wood pulp in the manufacture of paper is not new, but its increased use is very marked, as will be seen by comparing the statistics of the census of 1890 with those of 1900, in the amount of raw materials used in the manufacture of paper.

There is no limit to the range of wood suitable for paper making, though the pine family is most suitable for this purpose, and invention has been mainly directed to methods for reducing wood to a suitable condition for use in paper manufacture.

The value of pulp wood entered for consumption in the United States for 1889-1890 was $1,109,139.11; the wood pulp entered for consumption in 1899-1900 was $2,404,397.72.

The utilization of the needle-shaped leaflet of the pine tree, either alone or in combination with some other fiber, as cotton, for example, has frequently been attempted with more or less success to produce an article of commercial value for textile or other purposes. Near Breslau, in Silesia, there have been erected factories that convert the pine leaves into what is called "forest wool," for wadding. Other factories have been erected in other parts of Europe for a similar use of these leaflets, as in Sweden, Holland and France. The products made from these pine-tree leaflets have been exhibited at a number of expositions, where they attracted more or less attention as furnishing suitable material for stuffing mattresses and articles of furniture in place of horsehair, for manufacture into hygienic fabrics for medical use, and for articles of dress, such as inner vests, drawers, shirts,

chest protectors, etc. In the preparation of the textile material an ethereal oil is produced, which is employed as a curative agent and oftentimes as a useful solvent. Some attempt has been made of late in the State of Oregon to make use of these leaflets by reducing them to a fibrous condition suitable for mixing with cotton, to be spun into yarn for weaving.

Exhaustion of Wood.

A VERY interesting topic was discussed in the agricultural reports from France concerning the exhaustion of the forest supply of the world. M. Melard tells us that the world is using more wood for structural purposes than it is now producing. "The consumption of wood is greater than the normal production of accessible forests, and there is thus a continual deficit, which is made up for the moment by the destruction of forests." He states that in five years, from 1894 to 1898, France was obliged to import annually more than $28,000,000 of this sort of lumber, while exporting a little over $8,000,000 worth. He conceives that the tendency is to grow wood for fuel, and neglect those woods that are needed for construction. At any rate, England has entirely ceased exporting wood, and so has Holland. Belgium, with 17 per cent. of her territory woodland, has had an annual deficit of $20,000,000 worth. The same seems to be true of Germany, Spain, Turkey, Italy, Switzerland, and even Bulgaria. "These importers of wood have a collective population that represents 57 per cent. of the total population of Europe. At present the deficiency is made up by supplies from Hungary, Sweden, Norway, Finland, Russia, Roumania, the United States and Canada. These sources are in no condition to supply for any length of time the demands of the consuming countries."

The same authority tells us that, while the wood for fuel is decreasing in use, the use of wood for paper pulp is getting to be a tremendous factor in the problem. He thinks there is likely to be a wholesale destruction of forests before the public mind can be waked up to the real condition of affairs. It seems to be the soundest domestic economy to say to our young men who wish to make money in the future and be sure of doing so to plant forests. It would do no harm if every fifth acre in the United States were forthwith planted to valuable forest timber. It is not entirely settled that we shall not very soon need to go back to burning wood very largely for fuel. There certainly will be an increased consumption, unless electricity quickly supplants steam as a heating power, usable in our scattered homes, as well as in towns. There is some consolation in knowing that new fuels are being devised or discovered in different parts of the world. Russia has invented a way of impregnating ordinary peat with crude petroleum. The result is a substance that has a heat-giving value nearly equal to coal. Berlin has gone back to peat for fuel, owing to the coal famine in Europe. The Germans complain that their soil does not furnish either the peat or the petroleum; but in this country we have both; and it is not impossible that we have open before us a new industry of extraordinary importance. However this may be, the two facts for us to look directly in the face are (1) a coal famine in Europe, which will rapidly exhaust the coal supply of the United States, and (2) a very rapid deforestization of the world. The coal famine is coming on us far more rapidly than economists foresaw; the wood famine is likely to exert a serious pressure before those of us now living are off the stage. It will not do for a farmer to say, After me the deluge. A short road to money making is often ultimate impoverishment. The farmer is in duty bound to look ahead; not only for the collective good of the whole country, but for his own good. In the present case it is each man's individual interest to help to turn the tide which swept our forests out of existence and create an opposite movement just as strong in favor of replanting. Meanwhile, let us encourage in all possible ways schools of forestry, which teach the proper use of wood.—E. P. P., *N. Y. Tribune Farmer.*

Utilization of Pine Needles.

THE gathering of pine needles is becoming an industry of considerable importance on the Oregon coast. The yellow Oregon pine (*Pinus ponderosa*) furnishes the needles most in demand, which are used both for the extraction of their oil and for their fiber. Says Enos Brown, in an article on the subject in *The Scientific American:*

"Fifty years ago it was discovered that the extracts and products of the long slender leaves of the pine possessed real efficacy in complaints of a pulmonary character. It is claimed that insomnia yields to the influence of the pungent odor, and asthmatics have found relief in partaking of the oil, and in sleeping on pillows stuffed with the elastic and fragrant fiber manufactured from the interior substance of the pine leaves. The illimitable forests of yellow pine abounding in the State of Oregon, with their accessibility to through lines of transportation, suggested to a German from the forests of Thuringia the transfer of a lucrative business to the Pacific coast. In Germany the leaves never exceed two inches in length, while in Oregon they often exceed thirty inches, and average twenty. In the former country the forests laws are extremely strict and often prohibitive, obliging the maker of the product to use the dried leaves that have fallen to the ground, thus insuring an inferior and less effective quality of goods. In the Western State, denuding the yellow pine of its leaves has been encouraged, the expert of the forestry commission having pronounced the process beneficial. A tally kept of the weight gathered from a certain number of trees indicated that the crop taken in April weighed 650 pounds, while that of the same trees in October yielded 775 pounds."

Two crops are gathered yearly, Mr. Brown tells us, and the later one is always the larger. The leaves of young trees are preferred, being supposed to yield a better quality of oil. The leaves are stripped from the trees by women and men, who are paid 25 cents a hundred pounds for the needles. Says the writer:

"Five hundred pounds is regarded as an average day's work. The leaves are picked into sacks and hurriedly sent to the factory. Exposure to the sun causes the leaves to wilt, and impairs the quality of the product. In picking, the thickest bunches of leaves are selected, and the scanty ones neglected. The vast quantity available, so far beyond any present demand, permits the picker to thus discriminate. The factory at which the essences and extracts of the needles are manufactured has a capacity for handling 2000 pounds of leaves per day; but it is soon to be enlarged to about four times the present size.

"In the extraction of pine oil, 2000 pounds of green leaves are required to produce ten pounds of oil. The process is the ordinary one of distillation. In the manufacture of fiber the leaves pass through a process of steaming, washing, drying, etc., twelve in all, occupying four days. Two qualities are produced, first and second. The first, from which no oil has been distilled, is worth, upon the market, about ten cents per pound. The fiber is elastic, and the staple only little shorter than the green leaf from which it was made, with strength sufficient to enable it to be spun and woven into fabrics. Mixed with hair, the fiber makes an excellent material for mattresses or pillows, and repose comes quickly when resting upon them. It is also used as a partial filling for cigars, imparting a flavor not the least disagreeable, and calming to the nerves. The oil extracted gives an agreeable flavor to candies. Toilet soaps are made strongly impregnated with essential oil of pine needles.

"The fiber itself, after curing, looks like a slender shaving of some dark wood, retaining its odor indefinitely. Insects abhor it on that account. It is said that the Oregon factory is the only one in the world outside of Germany."

Influence of Forests on Water Run-Off.

IN Switzerland (see *Chron. Agr.*, Canton Vaud, 14 (1901), No. 11, pp. 300–305) a number of investigations have been made on the relationship between forests and rainfall. According to the author, it seems probable that forests increase the volume of total hydrometers, but the actual demonstration is difficult, and rests mainly on theoretical deductions. The forest cover, however, retains a considerable portion of the total moisture, spruce and fir retaining the largest amounts, the deciduous trees, such as the beech, oak and hornbeam, the least. It is stated that 25 per cent. of the total precipitation during the year is retained by the forest cover. Some of this ultimately reaches the ground, running down the larger branches and trunks, so that the soil of the forest receives about 20 per cent. less moisture than is deposited on an equal area in the open. The forest cover greatly diminishes the evaporation of water from forest soil than from a similar soil in the open. Upon plains and elevations up to 500 meters, forests tend to increase the volume of soil water, while from 800 to 900 meters and above, they diminish it. The forest trees are said to require only a small amount of water, as compared with agricultural crops occupying an equal area.

The mechanical effect of forests is shown in the increased permeability of the soil by the penetration of the roots to considerable depths. Upon a mountain side the forest, by its influence in carrying water deep into the soil, has the same effect as would be shown by a reduction of the slope. The total effect is unknown, but is being investigated at two Swiss forest stations. The proportion of subterranean water is increased and superficial moisture diminished under a forest cover. Streams having an origin between 400 and 800 meters elevation are usually more numerous, larger and more constant, by reason of the greater total moisture at that elevation. The forests aid in repressing floods by reducing the superficial soil moisture, and by indirectly diminishing the slope causing water to spread more evenly; as a result in wooded areas local floods are less frequent and less destructive than in denuded ones. The vegetable humus under the trees also acts as a sponge to absorb and retain moisture.

A Perfect Natural Graft.

MY attention was called one day to a white pine tree of considerable size, which is entirely free from any stump or roots, and yet is alive and thriving. (The tree is shown in the illustration.) Upon examination, this was found to be really the case. The history of the tree is as follows:

In August, about twenty years ago (1882), a laborer at the Mont Alto Furnace sprained his back. The old man who is standing by the tree in the illustration was sent out for pine pitch to make a plaster or poultice. He found this tree, which was, at that time, forked about two and a half feet above the ground. Beneath the fork of the branch on which he has his hand resting he cut out a large chip, in order to collect the pitch. This cut, however, was not deep enough to entirely sever the branch from the stem. The man says that he noticed that a few of the limbs of the two branches were very close, but did not notice any union. Both branches continued to grow. Finally several limbs from the two branches were grafted to each other naturally; at two places the two stems have become united, and at the cut the growth of the uninjured branch has been so great that the weakened one has been forced entirely away and the cut almost healed over. While the loose one can be moved slightly by the hand, nevertheless the graft is perfect, for that part of the tree flourishes and continues to grow, as is evinced by the new growth endeavoring to cover the scar at the base.

GEORGE H. WIRT.

Ice on Trees.

MR. W.C. NEWELL made some observations on the effect of the sleet storm last February on the trees at Doylestown, Pa. In a letter to Dr. J. T. Rothrock, Commissioner of Forestry, he says:

"Under separate cover have forwarded a picture (see illustration) which I thought would be of interest to you, taken in Doylestown, Bucks county, on the 22d day of February last, showing the effects of the terrible sleet storm on Friday, February 21st, which for severity has had no parallel in the memory of the 'oldest inhabitant.'" Dr. Swartzlander, of this place, weighed a twig with the ice on, and it was 15 pounds. After melting the ice, the twig weighed 9 ounces. This gives some idea of the tremendous load the trees and electric wires had to carry."

A Gigantic Sequoia.

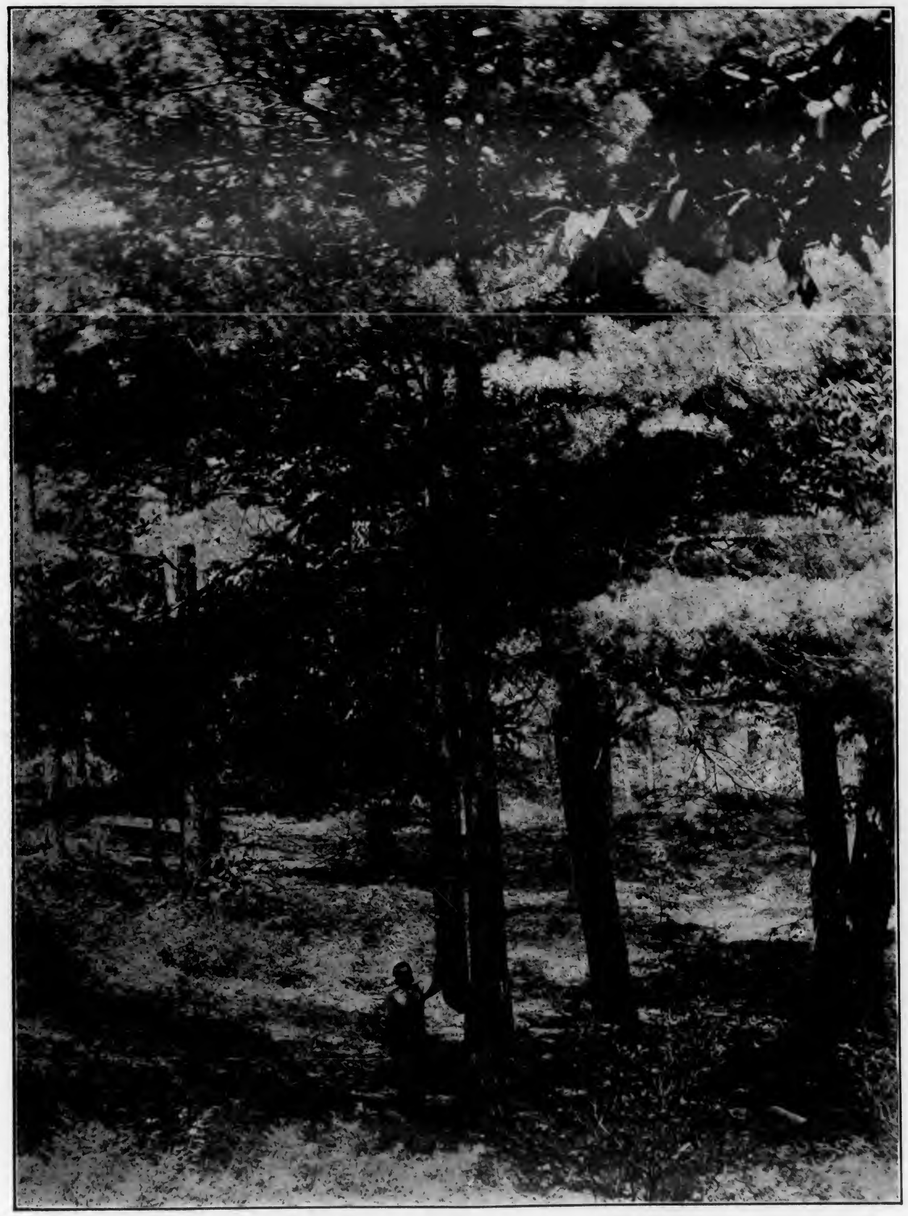
JUST outside the borders of the General Grant National Park, and barely within the boundaries of the United States Forest Reserve, there has been discovered the largest known tree in the world. Prof. John Muir describes the tree as being "well preserved, well balanced, noble and majestic," and gives the following dimensions, which he obtained by careful measurement: At one foot above ground the circumference is 108 feet; at four feet above ground, 98 feet; at six feet above ground the girth is 93 feet. The tree stands in a nest of lesser giants of its own kind, is three miles from Converse Basin, and directly back of Millwood.

This newly discovered patriarch is of the species *Sequoia gigantea sempervirens*, and belongs to a genus which flourished in North America and in Europe centuries ago, but which was overwhelmed by the hardships of time, of change and elemental caprices, until only two species survived to represent the genus, the *Sequoia gigantea* and the *Sequoia gigantea sempervirens*, both of which took up their permanent abode in California.

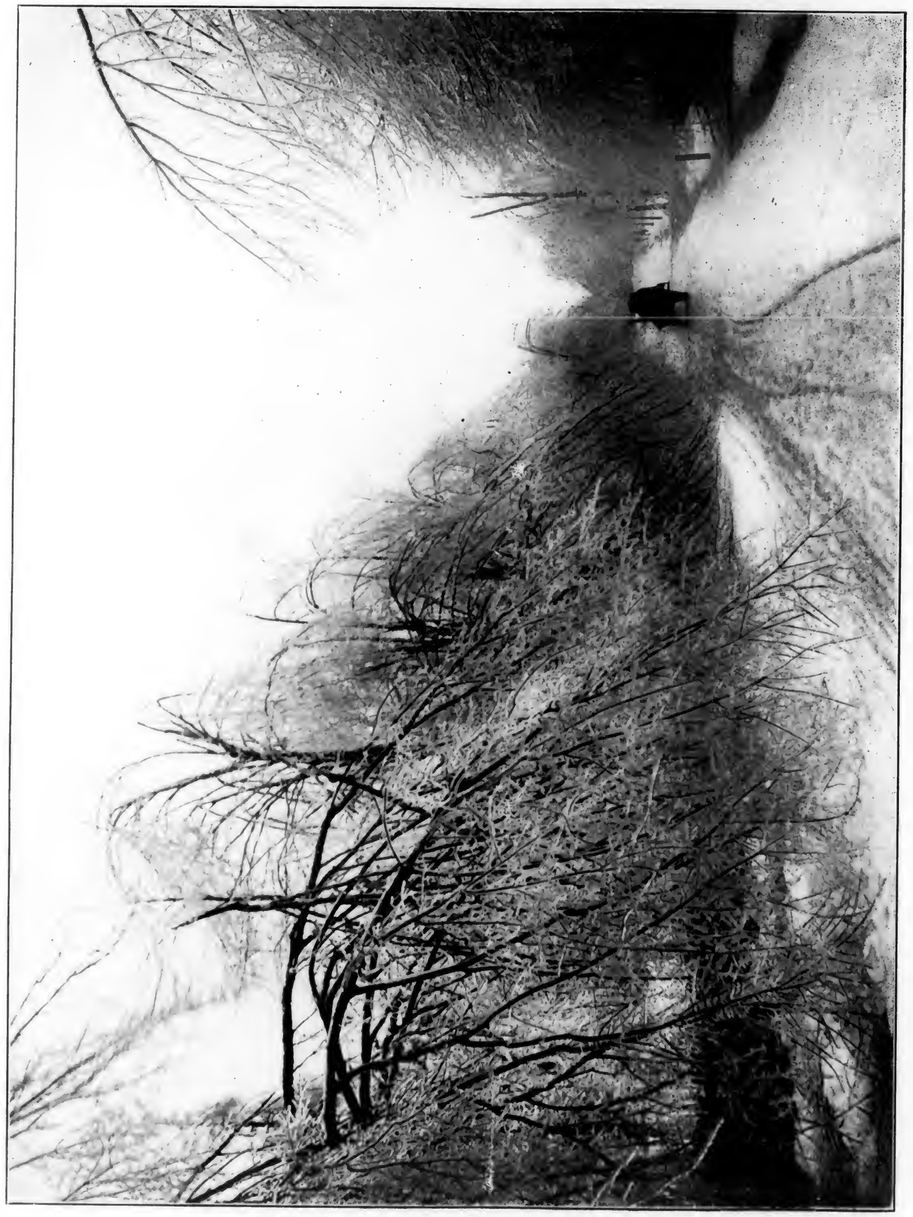
The massive, fluted trunk, straight and strong as a granite pillar, is covered with rich, cinnamon brown bark almost two feet thick, and is free from limbs to a height of 175 feet, where it is estimated to be eleven feet in diameter. The branches, clothed in dense foliage, radiate symmetrically from every side of the trunk above this height, and form a thick, flat crown, while myriads of cones flutter like gay green tassels on the outer borders of the foliage masses. These cones are two and a half inches long, one and a half wide, each having thirty or forty strong, closely packed rhomboidal scales, with four to eight seeds at the base. The most peculiar thing about these is that they are the smallest seeds produced by any of the conifers. The cones grow in clusters on the tips of the branches, and in one instance 140 cones were counted on a branch only one and a half inches in diameter. If not harvested by squirrels, these cones will discharge their seeds and remain on the trees for many years. This conifer produces more seeds than any other.

The blossoms appear toward the end of the winter, while the snow is yet deep, and look like thousands of bees on the ends of the branches. The pistillate flowers are about three-eighths of an inch in length. A curious characteristic, indigenous to the species, is that if the top is cut off by lightning a new one will take its place, forming slowly, as with thoughtful deliberation, but eventually assuming the perfection of its predecessor.

EFFECT OF SLEET STORM, FEBRUARY, 1902.
DOYLESTOWN, PA.

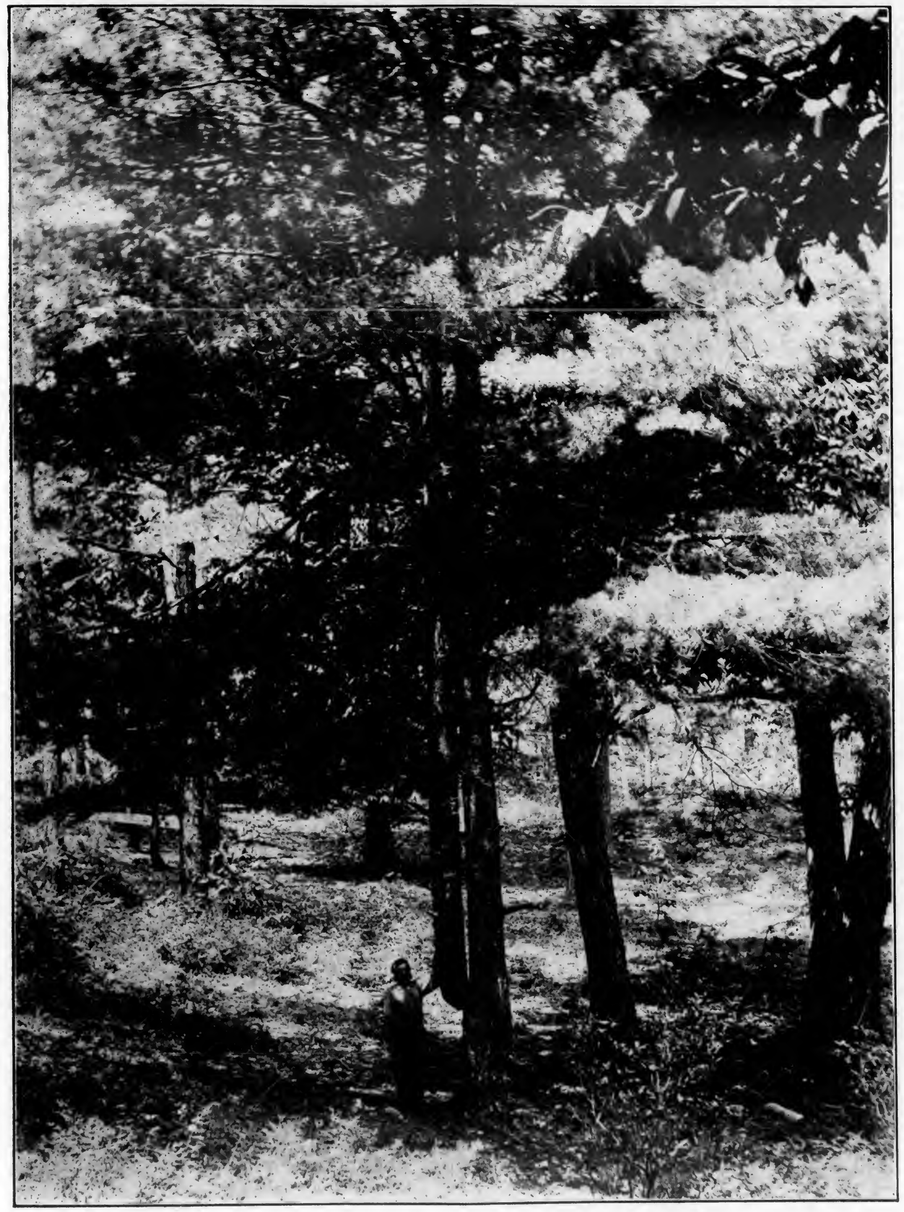


A PERFECT NATURAL GRAFT.
MONT ALTO, PA.



EFFECT OF SLEET STORM, FEBRUARY, 1902.
DOYLESTOWN, PA.

FOREST LEAVES, VOL. VIII., NO. 11.



A PERFECT NATURAL GRAFT.
MONT ALTO, PA.

INTENTIONAL SECOND EXPOSURE

Not until it reaches the age of 1500 years does this species attain its prime. For the first two or three centuries of their existence the growth of these trees has been estimated as being only eight or ten inches a year. The root system of these marvellous growths is enormous, for thousands of great brown coils radiate from every side of the massive trunk, gripping the earth with the tenacity of anchors, while lesser coils weave a strong, spongy, matted platform just below the surface—a platform which at the base of the new monarch covers an area 250 feet in width.

On this firm foundation the great tree stands, looming above its followers, a veritable king of the forest, peerless in its dignity. It is the music hall of the birds, the playhouse of the squirrels, and so lofty that the morning sun seems to rest on its rafters, while at night its dome appears to be jewelled with stars and haloed by the moon.

The Tan-Bark Coppice Forest at Hirschhorn.

AT the forest of Hirschhorn, on the Neckar, not far from the fine old town of Heidelberg, a most interesting industry is carried on in the production of oak-bark for tanning. It is especially interesting because so totally unlike anything that we have in America, and it seems to me more practicable than most things in European forestry, and suggests, at least, though it may not supply, a future remedy for the devastation that is now going on in our forests of chestnut oak.

The forest contained in the Oberforsterei Hirschhorn, as the district is called, embraces about ten thousand acres, of which thirty-six hundred are devoted to the production of tan-bark, the remainder containing timber trees and species used for firewood.

In the tan-bark section the trees come up from stool-shoots, fifteen years being required between two successive crops. But the whole forest is not peeled in any one year. It is divided into sections, and exactly one-fifteenth, or two hundred and forty acres, are peeled each spring, so that there is a steady income from the forest which nothing can destroy, for precautions against fire are such that a fire of any severity is impossible, and at the end of fifteen years the trees are not large enough to be subject to danger from snow-break or windfall. At this age the trees are naturally very small, being not more than four inches maximum diameter, but the stand is very thick, so that an average annual crop of 4580 pounds can be taken per acre. The unit of measurement for tan-bark is the centner, or a weight equivalent to about a hundred and ten pounds English. The average above referred to is forty-two centners, but some sections yield as much as sixty-two and a half, or 7000 pounds. When the yield of any section falls below thirty-three centners, or 3630 pounds per acre, the stand is considered too poor, and no more tan-bark will be raised there. Instead, the coppice-wood, or stool-shoots, will be allowed to grow into timber-trees, in the hope that the area will yield better returns as high forest, where not so many trees per acre are required as in the tan-bark industry.

The selling and harvesting of the bark is done by auction, and by contract, and in a way that would seem quite ridiculous in America, though here it is thought to be fair enough, and the people accept it as they do everything else in forest management—as a matter of course. The Oberforster, as the head forest officer of the district is called, estimates the stand of bark on the area to be cut each year, and sells it by auction at so much per centner, or hundredweight, standing in the woods. There is something of speculation in this, for the buyer must accept the Oberforster's estimate, and gains or loses, according as the estimate was too high or too low. Out of the money obtained from the sale of the bark the contractors must be paid for cutting, peeling and delivering to the river or railroad, for though the bark is sold standing, it must be peeled and delivered by the seller. The contracting for peeling, etc., is done on a very small scale, and the contractor who has a large family is fortunate, for he can put them all to work, and save the expense of hiring other laborers, which would be considerable in this vicinity, the pay of a man being rather better here than in most of the adjoining districts.

Everything in the forest is turned to profit, the peeled wood being sold for firewood—even the faggots containing sticks not more than a quarter of an inch thick bringing a price that clears the cost of cutting. After all the wood and bark has been sold and removed, there still remains some litter, which is burned in order to clear it away, and at the same time to improve the quality of the soil. Then the few trees that may have died during the course of the last fifteen years are replaced by seedlings. This planting sometimes amounts to five per cent. of the total number of trees in the stand.

This operation is the last step in the production of a crop of stool-shoots, and leads over into the beginning of the next rotation, as the fifteen-year period is called, when the first step to be taken

is something quite different, and to American eyes very extraordinary. This is nothing more nor less than the planting of grain in the prospective forest, and the harvesting of the same from between the young shoots. The explanation of such a proceeding is simply that the country around Hirschhorn is a very thickly populated district, and that land values are high, consequently, if the peasant can rent a part of the cut-over forest at a lower rate than good agricultural land, it is a great advantage to him. Of course, the reaping must be done with great care, and by hand; but this is no great drawback, as reaping with the sickle is customary in this part of Germany. It is interesting to note that, though the fields in the adjoining country have been so exhausted that large quantities of fertilizing material are necessary to produce a single crop of grain, none is required in the forest land, the leaf litter making the soil sufficiently rich. In the case of that portion of the forest owned by the town, the right to plant with field crops for one year free of charge goes with the contract for cutting and peeling the bark. Besides being a benefit to the peasant, the field crops are of a twofold benefit to the State by furnishing an additional revenue in the form of rent, and by improving the tree growth as a consequence of the loosening of the soil.

As a permanent business investment, such a forest is ideal, for I was informed that a steady income of from four to five per cent. was derived each year, notwithstanding the fact that only one-fifteenth of the entire area is cut. Such a system as that at Hirschhorn is now quite impossible under American conditions, but in the future, when our supply of tan-bark runs low, our rapid-growing chestnut oak would undoubtedly make a forest, managed on somewhat similar principles, more profitable than that of Hirschhorn.—J. V. DONIPHAN, JR., *in the New York Lumber Trade Journal.*

At a forestry convention at Moscow, Russia, it was stated that the results of a number of government tests showed that the best time to cut trees was near the end of June, while the bark would peel freely. Rails of young basswood, summer cut and seasoned, became nearly as hard as horn, while those which were winter cut would rot in a few years. Box elder cut in June, when peeled, dried, and set as posts for fences or sheds, had lasted sixteen years, while others similarly treated and used, but cut in winter and set green, rotted in four years.

Dendro-Chemistry in the Bureau of Forestry.

A RECENT important step by the Bureau of Forestry was the establishment of a dendro-chemical laboratory in co-operation with the Bureau of Chemistry. The need of a laboratory which would devote all of its attention to the study of the chemistry of forest products had been felt for some time, and this is the first of its kind in the United States, if not in the world. A number of laboratories devoted to the chemistry of tanning materials, and other materials used in the manufacture of leather, are in existence in England and on the Continent, but this line of work forms only a small part of the field.

The first work taken up by the dendro-chemical laboratory was a study of the chemical composition of the wood and bark of the Chestnut Oak, White Oak, Red Oak, and Black Oak. This investigation has been extended to the Western Hemlock, and other trees will be taken up in turn until an exhaustive series of analyses is obtained, including the most important American commercial trees.

Plans have been formulated for the study of the availability of certain hitherto unused woods as a source of wood pulp. Spruce and Poplar have so far been used for this purpose, but the supply of these woods is failing rapidly. The various woods will be subjected to the usual methods of paper pulp manufacture, and the pulp produced will be studied with reference to its yield and quantity, and tested as a basis for papers.

A study has also been planned of the composition and physical characteristics of the various papers, containing either mechanical or chemical wood pulp, which are found on the American market. The ultimate object of this work is the establishment of a paper testing laboratory similar to that now being operated by the German Government at Berlin.

An investigation which will receive attention as soon as the material is at hand is a study of the chemical composition and physical properties of American-tanned sole leathers, for the purpose of determining the influence of the method of tanning on the character and wearing qualities of the leathers.

In connection with the methods of kiln-drying lumber which are now extensively practiced, the dendro-chemical laboratory has been requested to make a study of the effect of dry and moist heat on the physical properties of various woods. The information secured in this investigation will be of practical value in connection with the use of lumber in buildings. This work has been held in abeyance until appropriate testing machines can be obtained, and it is then proposed to co-operate with the Road Material Laboratory of the Bureau of Chemistry, not only in this work, but also in the testing of wood paving blocks, and the application and effect of wood preservatives.

Another line of work to be taken up is an examination of American turpentine as found in the market. It is claimed that adulteration, especially with benzine and rosin oil, is extensively practiced, the result being a pecuniary fraud by which both the buyer and the ultimate user suffer. Paints prepared with such turpentine have less covering power and permanency.

One of the most interesting pieces of work being carried on by this laboratory is a study of the chemical composition, constituents, and the possible uses of a series of tree secretions which have been submitted by the Philippine Forestry Bureau at Manila.

The dendro-chemical laboratory is also conducting an investigation of chemical methods of killing useless timber.

Reforesting Connecticut.

PART IV., the conclusion of the report of the Connecticut Agricultural Station, at New Haven, has just appeared. It includes, with other matter, the report of the Station Forester on a new line of study, which was begun by the station some time since with funds left for its use by the late William R. Lockwood.

The study is on ways of improving the uncultivated land of Connecticut.

The work thus far has been chiefly in planting a 60-acre field of sandy barren land with valuable timber trees, and in planting in different ways to test the value of the different methods on such land. In connection with this work a forest nursery of some size has been established.

The Forester has also given advice and assistance to owners of woodland who wished to improve land already bearing a timber growth or to bring in valuable timber on land at present unused.

The State Forester has advertised for land for State parks, as provided in an act of the last Legislature, entitled "An Act Concerning the Reforestization of Barren Lands." Twenty-three persons have offered in the aggregate some 5500 acres, mostly in small parcels, at prices ranging from $1 to $4 per acre.

Most of these tracts have been carefully inspected by the Forester, and it is expected that a purchase will shortly be made.

There are thousands of acres in the State which are at present only an expense to their owners, but which can advantageously be brought to yield profitable timber crops.

A New Public Forest for Germans.

EMPEROR WILLIAM, carrying out his purpose of converting the Grunewald into a vast pleasure ground for the use of the inhabitants of Berlin, has approved plans for new roads, playgrounds, picknickers' glades and restaurants in the forest. One of the Emperor's objects is to encourage outdoor athletics. The forest contains 11,550 acres. It is a royal hunting preserve, but the foresters are now killing off the deer and wild boar there.

The British Forestry Inquiry.

THE first sitting of the Departmental Committee of the Board of Agriculture appointed to inquire into the present position and future prospects of forestry and the planting and management of woodlands in Great Britain, was held yesterday at St. Stephen's House, Westminster. Mr. Margerison expressed the opinion that Continental foresters grew much larger crops of timber on similar areas than do British growers. From his own experience in North Germany he knew that the trees were larger, straighter, and freer from knots and other defects than the English generally are, more attention being paid to systematic and scientific forestry. He was of opinion that a very large proportion of the timber now imported from other countries could, with proper management, be properly grown at home. Few foreign countries, however, could grow oak equal to British in size, strength, wearing and lasting qualities combined. As an experiment, six railway wagons had been built with a framework of English oak, and six with a framework of foreign oak, for exactly identical purposes. By the time the English timber waggons came in for repair the others were quite worn out. On the question of railway rates, Mr. Margerison said that where a ton of corn would cost 5 per cent. of its selling value in transport, a ton of timber cost 60 per cent. A ton of spruce from Canada would not cost any more than—if as much as—a ton of spruce from the Yorkshire hills to the Yorkshire coal mines. Preferential rates were costing timber growers as much as the rental value of the lands the timber grew on.—*Yorkshire Post*, England.

New Publications.

Sixth Annual Report of the Forest, Fish and Game Commission of the State of New York. Albany, N. Y. 4to, 532 pages, illustrated and bound in cloth.

This volume contains the Reports of the Superintendent of Forests, the State Fish Culturist, the Shellfish Commissioner, and the Chief Game Protector.

At the close of the year 1900 the area of the Forest Preserve was given as 1,370,928 acres, of which 1,290,987 acres are in the Adirondacks and 79,941 acres in the Catskill preserve. Unfortunately, according to the State law none of the timber can be sold, removed, or destroyed; but, in the hope that this law might be altered or amended, a definite working-plan was made by the Forestry Division of the United States Department of Agriculture for Township No. 40, covering some 25,000 acres containing Raquette Lake, $2000 being appropriated for this purpose. The results of this investigation were published in Bulletin No. 30, issued by the Forestry Division, which has already been described in these columns. The total amount of timber taken from the Adirondack forests not in the reserve in 1899 was 533,339,072 feet, over three-fourths of which was spruce. Colonel Fox reports that during the year 1900 but 14,893 acres were burned over, entailing a loss of $12,499, the fires mostly occurring on waste lands. During the fiscal year 1900, forty-six different actions for lumber stealing were successfully prosecuted, and fines collected amounting to $2207.76.

Mr. A. Knechtel contributes a comprehensive paper on "Methods of Estimating and Measuring Standing Timber," discussing the various systems used, with tables and formula for calculating the yield.

A particularly interesting article to Pennsylvanians is entitled "A Study in Practical Forestry," by J. Y. McClintock, being a description of the methods employed by the Girard Estate in reforesting lands on the drainage of Lost Creek, Pa., numerous illustrations of the plantations being given. The valuable work done by the Girard Estate has been mentioned a number of times by FOREST LEAVES, and data as to the results obtained given.

Col. William F. Fox contributed a "History of the Lumber Industry in the State of New York" which has also been issued as a "separate" and is reviewed below under this title.

The volume has numerous illustrations and colored plates.

Col. William F. Fox, Superintendent of the New York State Forests, has done a most substantial service in his painstaking "History of the Lumber Industry in the State of New York," published by the Bureau of Forestry, Department of Agriculture in Washington, as Bulletin Number 34. This Memoir is of 59 pages, with 19 very effective plates, which illustrate about every important phase of the lumber industry in the Empire State.

This paper is just what it claims to be, *a history*. It is so full of facts that one is at a loss to know just where to begin to quote from it, but it will be a surprise to most people to learn that "an early colonist built and operated sawmills one hundred years or more before there was one in England." The "mobs [in England], always opposed to labor-saving machinery, destroyed the first ones [mills] as fast as erected, through fear that the pit-sawyers would be thrown out of employment."

There were three sawmills built in New Amsterdam by the Dutch West India Company as early as 1623.

The Sawkill (stream) in Columbia County, N. Y., was so named because of the sawmill which was built there in 1661. And this leads to an interesting comparison with the north-eastern portion of our own State, which numbers among its best citizens some who are descended from the same early Dutch settlers. They left behind them in Pike County names which indicate their former presence; for example, Saw Kill, Bush Kill, Raymonds Kill. We have consolidated the two words into one.

As early, at least, as 1626 lumber and furs were sent from New York back to Holland.

Traces of early forestry ideas are brought to light in this history by Col. Fox. Thus in 1770 one "Adolphus Benzel was appointed inspector of His Majesty's woods and forests in the vicinity of Lake Champlain, at a salary of £300 per annum." His residence was at Crown Point.

In 1700 Lord Bellomont, Governor of New York, recommended that each person who removed a tree should pay for planting "four or five young trees," that no tree should be cut "that is marked for the use of the navy," and that no tree or trees be cut "but when the sap is in the root."

The first raft of lumber reaching Philadelphia via the West Branch of the Delaware River seems to have been one started by Jesse Dickinson, in the town of Tompkins, about 1788.

This little book is worthy of all commendation.

J. T. R.

Yearbook of the Department of Agriculture, 1901. Washington, D. C. 8vo, 846 pages, bound in cloth, illustrated. This book is always a welcome one, and contains, in addition to many other valuable papers, the following relating to forestry: "The Timber Resources of Nebraska," by William L. Hall; "Grazing in the Forest Reserves," by Filibert Roth; and "A Working Plan for Southern Hardwoods and its Results," by John Foley. The work of the Bureau of Forestry during the year is briefly reviewed, and is being carried out principally on three lines: First, forest management, involving the preparation of working-plans, etc.; Second, forest investigation, including tree planting, study of commercial trees, etc.; and, Third, the making and maintenance of records. During the year personal examinations were made of 788,890 acres of private ownership, and four detailed working-plans, covering an area of 226,000 acres, were prepared, others being under way. The preparation of working-plans for the Federal Forest Reserves is also being carried on. Extensive studies of the redwood, red fir and hemlock of the Pacific coast have been completed and are ready for publication, while others are under way. The proposed Appalachian Forest Reserve was also examined, and the creation of the reserve urged. A number of other investigations are in progress. 46,145 acres were examined for planting during the year and plans prepared for 5785 acres. The volume contains a large number of useful agricultural papers.

The Western Hemlock. Bulletin No. 33, by Edward T. Allen, Field Assistant, Bureau of Forestry, Department of Agriculture, Washington, D. C. 8vo, 55 pages, illustrated. The Hemlock tree has unfortunately borne a poor reputation among lumbermen, and in his report Mr. Allen has endeavored to remove this prejudice and to point out the uses of Western Hemlock, its economic value, and the conditions under which it can be profitably grown and lumbered.

Mr. Allen states that the Western Hemlock (*Tsuga heterophylla*) extends from Alaska to Marin County, California, and from the Pacific coast to Montana, forming 3 per cent. of the forest of Washington, and is abundant in Oregon.

It rarely occurs in pure stands, commonly being mixed with Red Fir, Spruce, Cedar and White Fir. As a rule the Western Hemlock is usually 3 to 5 feet in diameter but occasionally one 8 feet in diameter and 250 feet high is found. The tree will germinate and grow in dense shade, but not as rapidly as in the light, and requires heavy rainfall. The wood is light, rather hard, straight-grained, tasteless, tough, and usually white. In strength, ease of working and freedom from warp or shape it differs from the Eastern species, whose deficiencies in these respects are its chief drawbacks; it is not suitable for heavy construction, or where it is exposed to the weather. It has been found suitable for flooring, joists and scantling, laths, siding, ceiling, newel and panel work, woodenware, wood pulp, and especially in the manufacture of boxes. The bark is valuable for tanning purposes, and tables of its yield are given.

The tree is subject to the attacks of a number of insects and fungi, which are mentioned in detail.

Valuable tables are given of the yield of lumber from trees of different sizes, diagrams of growth, etc., and the problem of the utilization of cut-over lands discussed.

The numerous illustrations aid in a full understanding of the report.

Water Supply and Irrigation Papers Nos. 62 and 63. "Hydrography of the Southern Appalachian Mountain Region." 8vo, 190 pages, illustrated. United States Geological Survey, Washington, D. C. These two pamphlets, by Mr. Henry A. Pressey, give systematic measurements of the streams in the Southern Appalachian Mountain district, and data of special investigations made in connection with the importance of the streams in the development of the country, presenting much valuable data in regard to a region from a portion of which it is proposed to form the National Appalachian park or reserve, the bill for which passed the Senate at its last session and will be considered by the House of Representatives at its next session. Full data is given as to the drainage basins of the various streams starting in this district, the physical features, forests, rainfall, water powers, etc., the views and maps aiding a thorough understanding of the subject.

Seventh Annual Report of the Chief Fire Warden of Minnesota, 1901. St. Paul, Minnesota. 8vo, 135 pages, illustrated. From the Report of General Andrews it appears that in 1901 there were reported 55 forest fires, which burned over 58,395 acres of mostly light timber, brush and meadows, with a loss of $42,140. The number of prairie fires reported was 15, which burned over 6120 acres; damage, $2402. There were nineteen prosecutions for carelessly causing forest or prairie fires and seven convictions.

It is estimated that there are in scattered localities, and principally in northern Minnesota, 3,000,000 acres of waste sandy, hilly or rocky land that is only fit for bearing pine forest. Hence, if the State were now to begin to plant

that land with pine at the rate of 37,500 acres per year, the whole would in eighty years become a well stocked normal forest, yielding perpetually thereafter 675,000,000 feet board measure annually. The net annual revenue to the State would be just what this amount of 675,000,000 feet would, at such future time, be worth, standing.

The report contains the Morris bill, passed by Congress June, 1902, for opening the Chippewa reservations near Cass and Leech lakes. Under this act the pine timber is to be cut and sold for the benefit of the Indians. Only the merchantable pine is to be cut on the pine lands. After the pine is cut, the lands are to be open to settlement. 200,000 acres of the pine lands are to become and remain a forest reserve as soon as the pine is cut thereon, and on these lands five per cent. of the standing pine is to be left for reforestation. In addition, ten sections (6400 acres) of land with the timber thereon, are to form a part of the reserve. The islands in Cass and Leech lakes, and Pine and Sugar points, are to remain as Indian lands.

For over twenty-five years, Minnesota has paid $20,000 a year in bounties for planting trees on prairie land; the bounty being $2.50 per acre for a period of six years for not exceeding ten acres for each individual.

The report contains short and practical sketches of the administration of State forests in sixteen countries in Europe, obtained from the respective governments, and a "forest working plan report" from Dr. William Schlich's Forestry Manual.

Forest Reserve Manual. The Department of the Interior has recently issued a manual for the information and use of the forest officers in charge of the National Reservations. It discusses briefly the objects of the Reservations, and then, at length, the utilization of them in accordance with these objects. Every piece of work done and every permit granted is considered as to whether or not the future timber supply or the water flow will be injured in any way. Very definite instructions are given the officers in regard to examining existing conditions. and the probable results of any grant, whether for lines of communication, buildings, mining claims, grazing, the "free use" of timber or the sale of it. A special blank permit is issued for each item. Restrictions and penalties are given briefly; however, the duties and the rank of the officers are given in full, with practical suggestions or directions as to fighting fires, surveying and mapping, and estimating timber. Blank copies of reports which must be forwarded to the Department each month are added.

Without doubt the book will serve its purposes. It places in the hands of the officers a concise statement of their duties, and, in particular cases, instructions for carrying them out. At the same time it gives to the public a set of rules which it must respect.

What is suitable might be incorporated into a manual adapted to our State needs, and we have hope that such will be the case before long.

G. H. W.

We have received a paper entitled "A New Method of Testing Fire-Resisting Qualities of Fire-proofed Wood," by Ira H. Woolsen. [Reprinted from *School of Mines Quarterly*, Vol. xxiii., April, 1902, No. 3.]

This is a most important practical subject; one in which the architect, engineer and fire insurance companies are primarily interested, though it is well worth the study of the forester. The term fire-proofing as applied to wood appears to be a misnomer. None of the processes render wood (it appears) incapable of combustion. They simply retard to a greater or less degree the rapidity with which wood may be consumed.

The author simply reports progress in a series of experiments which he has been conducting. Mr. Woolsen's object in writing the paper was to call attention to a new method of testing the degree to which timber has been fire-proofed. He calls it the "Timber Test." Essentially it is this: "Specimens one inch square and one foot long were selected from the same relative place in each board to be tested. These 'timbers' were tested in pairs (either duplicates, or comparison pieces from two different processes), by being laid across the top of a six-inch gas crucible furnace, in which a constant temperature of 1700 degrees F. was maintained. At the end of two minutes the specimens were removed, held in the air, and duration of (1) flame and (2) glow noticed in each."

The author thinks the "Timber Test" is at least as satisfactory as any hitherto used.

J. T. R.

Thirteenth Annual Report of the Missouri Botanical Garden. St. Louis, Mo. 8vo, 234 pages, illustrated, bound in cloth. This Report has been prepared by the Director, Mr. Wm. Trelease, giving a statement of the work done during the year; and, in addition, a most thorough and exhaustive paper on the *Yucceæ*, treating in detail all the various species, the whole being finely illustrated with 100 plates.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIAL.

WE give much of the space of the present issue to the proceedings of the annual meeting, and FOREST LEAVES reaches its readers later than usual because it was held to present these proceedings promptly. The members of the Association will find much to encourage them in the reports presented.

It has been our endeavor, in the regular issue of FOREST LEAVES, to call attention to the various evidences of progress which are briefly summarized in the reports, but it will not be out of place at this time to invite attention to some of the growing possibilities of forestry which are touched upon in the various papers.

The protection and care of our woodlands carries with it better control of streams, which means improvement in quality of water supplied and in regularity of power produced. It permits of largely extending irrigation in the arid and semi-arid regions. It encourages, by the creation of forestry schools and chairs in colleges, a broader education and an appreciation of natural growths. One of the most attractive features of forest reserves which was emphasized is the possibility of utilizing these for the relief and possible cure of pulmonary diseases, which have been the cause of great suffering and distress, and have carried off many in the prime of life.

The reports demonstrate that forestry is far from a local consideration; its effects and its influence are as broad as the country. It should command the attention of all sections and support of all intelligent people. J. B.

* * * * *

The suggestion that chestnut fruit be propagated as food may seem inappropriate for a country which produces corn and wheat abundantly; but when the large number of Europeans who depend upon chestnut bread is appreciated. the idea is more attractive.

Narrative of the Annual Meeting of the Pennsylvania Forestry Association.

THE annual meeting of the Pennsylvania Forestry Association was held at 1012 Walnut Street, Philadelphia, on December 8, 1902, President John Birkinbine in the chair.

The minutes of the previous annual meeting were read and approved, followed by the Reports of Council, the Treasurer, President, and General Secretary, which will be found on other pages in this issue.

Mr. Charles Hewett, Chairman, presented the report of the Nominating Committee, and Messrs. A. W. Crawford, Howard A. Chase and J. G. Dillin were appointed Tellers of Election.

While the ballots were being distributed, a communication was read from the John Bartram Association urging an appropriation of $10,000 by the City Councils of Philadelphia for the Bartram Park. It was moved and carried that the memorial as presented be approved.

The Tellers then announced that the following officers had been unanimously elected :

President, John Birkinbine.
Vice-Presidents, Wm. S. Harvey, James C. Haydon, Albert Lewis, Richard Wood.
General Secretary, Dr. Joseph T. Rothrock.
Corresponding Secretary, Mrs. John P. Lundy.
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Northumberland County, G. R. Van Alen.
Perry County, Mrs. John Wister.
Philadelphia County, Hon. W. N. Ashman, Henry Budd, Henry Howson, Joseph W. Johnson, J. Rodman Paul, Albert B. Weimer, Dr. W. P. Wilson.
Pike County, Arthur M. Adams.
Potter County, Arthur B. Mann.
Schuylkill County, Wm. L. Sheafer, Heber S. Thompson.
Somerset County, H. D. Moore, M.D.
Sullivan County, Hon. B. W. Jennings.
Susquehanna County, Edgar A. Turrell.
Tioga County, Charles Tubbs.
Union County, Andrew Albright Leiser.
Venango County, James Denton Hancock.
Warren County, H. H. Cumings.
Washington County, Wm. Parkison Warne.
Wayne County, Alonzo T. Searle.
Westmoreland County, Hon. Lucien W. Doty.
Wyoming County, James W. Piatt.
York County, Dr. I. C. Gable.

A letter from the Allied Agricultural Organizations of Pennsylvania, suggestions in regard to the proper care of the trees on the east side of the Wissahickon, and the proposed endorsement of the Pennsylvania Forestry Association for setting apart as a park the Sherwood forest, a tract of 30 acres of timber land in the limits of the city of Philadelphia, were discussed and referred to Council for action.

The advisability of holding meetings or excursions in the woods in different parts of the State was also discussed.

On motion, adjourned *sine die*.

Address of the President of the Pennsylvania Forestry Association.

POSSIBLY a brief retrospect, followed by a summary indicating the present status of the forestry movement, will be an acceptable statement to offer at the seventeenth annual meeting of the Pennsylvania Forestry Association.

When early in 1886 the initial effort was made to interest citizens of Pennsylvania in forest protection there was little encouragement given, but persistent effort has resulted in securing a strong association, and our success has been the incentive for similar organizations in other States.

While priority in date is claimed by others, no forestry organization in the United States has existed as long as the Pennsylvania Forestry Association without reorganization or change in name, and none is believed to be as strong numerically. The 1735 members on our rolls makes the Association a power, and the high character of the membership increases this power. One of the first efforts to excite interest in the forestry movement was the issue of FOREST LEAVES as the organ of the Association. For sixteen years and a half this publication has continued to wield an influence in the cause of forestry, and the prospects for future usefulness are most encouraging. This effort, too, has been followed, and there are now several most commendable American publications engaged in the effort to popularize forestry.

When the Pennsylvania Forestry Association was organized the few State laws which could be considered as affecting the permanency of our forests were practically worthless, by reason of imperfections or by failure to enforce them. The general conditions throughout the United States were, with few exceptions, about on a par with those in Pennsylvania. Woodlands were sacrificed by wasteful cutting, by fire, and by neglect. Timber thieving or damage was practically considered as unworthy of punishment. The trees had apparently few friends, and fewer champions. Denudation of forests was proceeding with reckless extravagance, and the influence which wooded areas exert upon stream flow was unappreciated.

The problem which those active in initiating the Pennsylvania Forestry Association faced was discouraging, but to-day we point to marvellous advances in interest, and many tangible evidences of progress. The apathy of the people of the State has given place to lively interest, our Legislatures have enacted laws which protect our forests, and this action has had the cordial support of Governors during their respective terms, each apparently taking ground in advance of his predecessor and leading the movement. We have established as a feature of the State Government a Department of Forestry, which has created reserves of a half million acres. This, while but one-third of the acreage reserved by the State of New York, is destined to grow under the intelligent direction of the Forestry Commissioner, Dr. J. T. Rothrock, whom we all hope will permit himself to be continued as the State officer.

Other States have established reserves, and private individuals, railroad and lumber companies, and game associations, have helped to swell the aggregate.

Ten years ago, when you first called me to the office of President, the United States Government had about three and a half million acres of forest reserves ; to-day the aggregate is nearly 59,000,000 acres, or 92,000 square miles ; about double the area of Pennsylvania. This aggregate omits reservations of National Parks. Hence if all the reserves—National, State, corporate, or individual —are grouped, the total reaches most impressive proportions.

Our National Government has taken advanced position in forest protection which is not confined to the reservation of forest areas, but by legislation has provided for the care of the reserves, while the punishment of those who invade public lands to appropriate timber, or who cause its destruction by fire, has been made effective. The action of the last Congress in providing for an extension of irrigation under Government direction carries with it the necessity of forest care.

The importance of forestry has been prominently treated in Presidential Addresses, and the work done by the Department of Agriculture and of the Interior has been most beneficial.

With favorable official consideration from the general and State governments, with National and State associations advancing forestal interests, with chairs of forestry connected with several colleges, with periodicals as propaganda, and with the general support of the press, forestry is now well before the people and is winning favor.

The foregoing can be considered merely as a

general summary. To go into details or specify individual effort would take more time at this meeting than your President should claim. These details and individual efforts have from time to time been chronicled in FOREST LEAVES,—a policy which will be continued.

In completing ten years of service I, however, cannot refrain from bearing testimony to the unselfish devotion and earnestness of those who have served on the Council of the Pennsyvania Forestry Association. Some still active on the Board have been connected with it since the first organization of the Association, and a majority of those who now constitute its Executive contingent have served during the full decade above mentioned. Whatever has been accomplished, therefore, by the Association is to be credited to the persistent and earnest efforts of Council, and surely its members have reason for gratification.

JOHN BIRKINBINE,
President.

Report of the General Secretary of the Pennsylvania Forestry Association for the Year 1902.

THE chief events of interest occurring within the Association have been placed before you by the reports of the other officers of the Association. From his official position as Forestry Commissioner of the Commonwealth you may naturally expect from your General Secretary a statement of facts in State work which would bear upon and influence the work of this organization.

It is now generally known that at the close of the administration of Governor Stone the State will be in practical possession of about a half a million of acres of land which is to be devoted perpetually to forestry.

It is proper that I should say here, at the outset, that Governor Stone has taken the liveliest interest in the forestry work. On every occasion he has impressed upon the Commission the importance of prompt action in securing land for the State. In no instance has he failed to approve the purchases made for our forest reservations. It is also proper to say that, so far as we are informed, there has been nothing but approval by the public for the work of the Forestry Commission.

It is also gratifying to add that the Governor-elect has, in more than one instance, proven himself a friend to the forestry movement. We have, therefore, the reasonable assurance that the work may be expected to progress under his administration.

With such help, past and prospective, it is fitting that we should now ask what is to be done with the vast land holdings which have come under State control? First of all, let me say that the land has been purchased because it was thought that it was for the pecuniary advantage of the Commonwealth. No mere sentimental considerations were allowed to enter into the transaction. It is therefore of the first importance that the forest reservations should at once be placed under a sound, practical, business control. Income, in one form or another, must be derived from them. As all of our earlier relations to the forests have been of a destructive character (often necessarily so), all work of restoration and protection must be diametrically opposed to the work we have done in them up to this time. Work presupposes workers. It is imperative that there should be trained workers. Such men are not now available. There are now enough of trained foresters of high grade in the country to supply immediate demands. There is, however, urgent need of a lower grade of employees; that is, of men who can be trusted to supervise actual forestry operations. I know of no better way of providing such help than by educating young men on the reservations, where, by a combination of work and study, they may be immediately fitted for practical field operations. It is not enough that they should have a general knowledge of practical forestry. They should recognize what a day's work is, and be able to do a day's work themselves, and so be fitted to take charge of working-gangs in the woods. They should be able to fight fires, to survey land, to make roads, to manage forest nurseries, to transplant trees, and to do all the manual labor which falls to the lot of the working forester.

I am glad to report that, even without State appropriation, we have been able to make a start in the direction of training such men. Fortunately we have in our State Forester, Mr. George H. Wirt, a man of ample training, good sense, and an honest devotion to his calling. He has, of his own motion, undertaken to lay the foundation of such a forestry school at Mont Alto. It is now in order for the State to officially recognize the importance of this, and to provide funds which will enable the educational work to be on a scale commensurate with the importance of forestry to Pennsylvania.

It is with great pleasure that I here say the State Federation of Woman's Clubs, at its Titusville meeting, in October, specifically urged that such a school should be created and maintained by legislative enactment. Fifteen thousand dollars would provide ample funds to purchase buildings and maintain the school for two years. I trust that this plan may meet with the approval and support of this Association!

I do not wish to be misunderstood, however, in this matter. I have nothing but good to say of such forestry instruction as is given at Yale and Cornell Universities and on the Biltmore estate. Their courses are of a more scientific character than the ones I have outlined above. It would be my hope that the best men from the reservation school which I have advocated would go to one or the other of these or some similar institution for higher instruction, which would round them out into fully-educated foresters, representing with both practical and scientific instruction the most productive type of forestry directors.

I can see no reason why a fully-equipped school of forestry should not also be found at one or more of the great educational institutions of this State, for forestry is something more than a mere art. It takes rank in Germany with other well-recognized branches of political economy. It would be well indeed for the nation if all of our statesmen recognized its bearing upon the prosperity of the country.

I am glad to report substantial progress in actual forestry work. At Mont Alto a nursery for the production of forest trees is already successfully established. As a commencement, 15,000 young white pines were set out on State ground last spring, and are doing well. In two years we will have about a half a million white pine seedlings ready to transplant. A chestnut orchard has been started with a view to furnishing an object-lesson, and to introducing a new industry in this country by making chestnut-meal for sale. Full information upon this important business will shortly be published. A considerable area has been planted in black walnuts.

Some work also has been done by order of the Forestry Commission upon the roads which run through the State Reservations.

The demand for pulp-wood is on the increase and the supply is becoming smaller. It is not too much to say that at once, under judicious thinning out of our State forests, a very considerable revenue could be derived. In my judgment it is important that this work should be commenced immediately: First, because the forests themselves require it; second, because it would bring some revenue to the State; and third, because it would show residents in the neighborhood of the reservations that State forests should be protected against fire and illegal depredation in order to furnish work to our people. No sane man would burn up what was a source of income to him.

In spite of all legislation thus far had, forest fires continue to be a menace, in large areas, to forest restoration. It must be remembered, also, that when a fire has been started its severity will often depend upon the quantity and combustibility of the fuel (leaves or wood) on the ground, and in the speed and force of the wind. There come times occasionally when it seems almost impossible to check a fire.

The Forestry Commission should have authority to have a well-organized and well-equipped gang of fire-fighters on each of our reservations.

It is as cheap to prevent a fire as it is to fight one, though in the former case we save the young timber, and in the latter we lose it. The gain of prevention is all on the side of the State.

It is gratifying, however, to note that in several parts of the State the citizens are of their own motion organizing associations to prevent forest fires. This is a most hopeful sign, because it indicates a radical change from the carelessness which formerly prevailed. Several hunting clubs operating on State lands have also voluntarily pledged themselves to cut no living timber, to prevent escape of fire from their camps, to aid in suppressing forest fires, and to aid in punishment of those who start them or who hunt illegally. It is well for us to remember that so long as wars must be, the rifle will be a most important factor in determining to which side the victory will go. In the late Boer war the most effective soldiers were those who knew best how to use this dreadful weapon. The Boers were all hunters, and the riflemen of the Canadian contingent were the very best soldiers on the English side. On our reservations I have this year seen boys who were trained riflemen, and it is not too much to say that these reservations are still producing riflemen whose deadly aim would, in the hour of our nation's peril, maintain the brilliant record made by our famous Bucktail regiment in the Civil War. As a measure of self-protection the State should, under proper restriction, encourage lawful hunting on our forestry reservations.

As an outing-ground for our own citizens, our reservations must continue to become more and more important. No fact is now better established than that consumption is a curable disease. I have this season seen most remarkable results produced by open air life on the State lands. Beyond doubt we have opened an important means of restoration to health by inviting those whose means do not allow them to seek more distant resorts, to go to our own mountains. By personal solicitation I have been enabled to obtain funds for establishing a small sanatorium upon the Mont Alto Reservation. The results have been gratifying beyond my expectation. What is now most

needed is to enlarge its usefulness and to place the camp under proper control, in order to prevent escape of disease from it. This can all be done, with absolute certainty, by the expenditure of a very small sum of money.

The continued support of the New Century and other allied woman's clubs, and also of the newspapers of the State, has been a most powerful factor in our past success. Of course our own organization has been a pivotal centre from which hasty and efficient help could at all times be directed; but our work has just commenced. We must guard forestry from unwise efforts as well as from hostile legislation, and on the other hand we must do our full share in directing the forest policy of the State into productive channels.

The officers and working committees of this Association deserve well of their contemporaries and successors. Without hope of reward, and often at the sacrifice of their own personal interest and comfort, they have given the forestry cause in Pennsylvania their most loyal support. The results in this State will bear comparison with those obtained anywhere in our country.

The singular unanimity with which the best men, in all political parties, at our last legislative session supported the forestry measures shows that they were representing fairly and honorably the wishes of their constituents, and that the measures were in accord with their own views.

I beg permission to thank the Council, committees and members of the Association for their kindness to me.

Respectfully submitted,
J. T. ROTHROCK.

Dougherty County lays claim to the champion big tree of Georgia. It was discovered several weeks ago by employees of the Red Cypress Lumber Company, who were engaged in cutting timber in the midst of a thick swamp where hardwood trees abound, and to this is due the fact that it was not discovered sooner.

This giant of the swamp is a sycamore. It is on a little knoll, and, except in seasons when a great deal of rain had fallen, its trunk is not reached by water. A foot from the ground its trunk is forty-four feet in circumference. For twenty feet above the ground the body of the great tree is round and symmetrical, but at that point it branches into four sections, any one of which would make a giant tree if standing alone. The four arms of the big sycamore do not spread out as would seem natural, but reach skyward, almost perpendicularly. The tree is pronounced a curiosity by all who have seen it, and places "in the shade" all the known trees in Georgia.

Treasurer's Report.

THE fiscal year of the Pennsylvania Forestry Association ends on December 1, 1902, and the following is a statement of the finances of the Association on that date:

Treasurer's Statement to December 1, 1902.

		Dr.
To balance on hand December 2, 1901,	.	$ 498 00
Cash, annual dues to November 30, 1902,	.	1189 00
Cash, donations and subscriptions,	.	257 00
Cash, Life Membership fees,	.	495 00
Cash, sale of FOREST LEAVES and advertisements,	.	121 45
Cash, rent and office expenses paid by the City Parks Association and Woman's Sanitary League,	.	187 50
Cash, interest on Life Membership bond,	.	25 00
Cash, from Country Branches for dues,	.	10 00
		$2782 95
		Cr.
By cash, sundries, postage, office rent, etc.,	.	$ 429 31
Publication FOREST LEAVES,	.	962 09
Assistant Secretary's salary,	.	600 00
Life Membership fund,	.	495 00
Meetings,	.	128 57
Expenses of Membership Committee,	.	96 54
Balance on hand December 1, 1902,	.	71 44
		$2782 95

The Forest Leaves Fund.

Invested,	$1495 42
Cash on hand,	156 00
	$1651 42

The Life Membership Fund.

Invested,	$1089 59
Cash on hand,	170 41
	$1260 00

CHARLES E. PANCOAST,
Treasurer.

Examined and found correct.

WILLIAM S. KIRK,
ALBERT B. WEIMER, } *Auditing Committee.*

The Illinois Central R. R. will plant 110,000 catalpa trees at Harahan, La., seven miles from New Orleans, under direction of the Chief Engineer.

The *Catalpa speciosa* was selected on account of quick growth and variety of uses. It was stated that growth was nearly 2″ in diameter per annum. The seedlings planted in 1890 are now 20 to 25 inches in diameter. The trees are to be planted eight feet apart, and later thinned out to 16 feet, the trees cut down being suitable for fence posts.

The Boston and Maine R. R. were to plant 10,000 catalpas, on unproductive vacant lands of the company, with the view of obtaining poles, posts, ties, etc. Chestnut and black walnut trees were also to be planted.—*Engineering News.*

Report of Council of the Pennsylvania Forestry Association.

DURING the past year quorums were present at all the regular meetings of Council, one of which was held at the inn at Buck Hill Falls, Pa., through the courtesy of Mr. Howard M. Jenkins, President of the Buck Hill Falls Association, and was especially well attended and interesting.

The proposal of the Appalachian National Park Association to establish a National Forest Reserve, not to exceed 4,000,000 acres, in the southern Appalachian Mountains, was endorsed, and resolutions to that effect passed. The bill authorizing the creation of this National Appalachian Forest Reserve passed the Senate at its last session, and will now be pushed in the House when it convenes in December.

Both Spring and Fall Arbor Days were well observed throughout this and neighboring States, the schools being especially active.

On Friday, April 4th, through the courtesy of the Board of Managers, an Arbor Day meeting was held at Haverford College, Pa., when addresses were made by officers of the College and our Association. Trees kindly donated by the Messrs. Wood were planted, and refreshments served.

The Association also aided in the observance of Fall Arbor Day, formal exercises being held at Girard College, and an elm tree, donated by our organization, planted.

In January, 1902, the "Forester," which had been published by the American Forestry Association, was merged and issued as "Forestry and Irrigation," the joint publication of that Society and the National Irrigation Association. This left FOREST LEAVES the sole journal in this country entirely devoted to forestry interests. Lately, however, two new publications, entitled "Arboriculture," issued by the International Society of Arboriculture, and "Woodland and Roadside," the quarterly of the Massachusetts Forestry Association, have appeared.

The various committees of Council have been doing good work, both in and out of season, in increasing the membership and educating sentiment in favor of forestry.

The money which has accumulated in the past three years in the life membership fund was invested in a $1000 railroad bond, and we are pleased to record the setting aside of this fund, which in previous years had been used for running expenses.

At the last annual meeting there were 1630 names on our rolls; since that time 166 new members have united with us, 37 resigned or were dropped, and 24 were reported deceased, making a net gain of 105, and bringing the total membership up to 1735. We trust that all of the members will use their best efforts to aid in at least doubling this number, as it will be a great help in increasing the influence and use of the Association.

During the year large areas of desirable land have from time to time been added to the State forest reserve, which now comprises 500,000 acres, and, while it will be dealt with in the report of the General Secretary, is a source of much gratification.

Similarly, the number of the National forest reserves have been added to (among others, one of over 4,500,000 acres being created in Alaska), while some of those already existing have been enlarged; one has been decreased, and a portion of another has been included in the Crater Lake National Park, making the total area of all the national forest reserves 58,850,925 acres, or about one-fortieth of the land area of the United States, exclusive of our new island possessions, a slightly higher proportion than at present exists in Pennsylvania, which latter, we hope, will be soon augmented. The neighboring State of New York has already over 1,400,000 acres of forest reserves, or three times the amount possessed by our own State. Competent authorities state that the proper proportion of wooded land in a country is one acre of forest in every five, or 20 per cent.

We regret to chronicle the death, by an accident, of Mr. Howard M. Jenkins, Vice-President of our Association, who has been active in our organization almost from its inception; whose wise counsel, keen judgment and business acumen were active in forwarding the cause of forestry in general, and our own Society in particular. He was taken away just at a time when some of his projects were completed, and he could have secured a well-earned rest.

At the opening of the year 1903 the biennial meeting of our Legislature will be held, and it will be necessary for the Association to be in position to take prompt action to aid the passage of any needed forest reform, or defeat hostile legislation. While we have much cause for congratulation for what has already been accomplished, there is even a wider and more important field we are now entering on, in the proper care and utilization of the forest reserves already secured.

F. L. BITLER,
Recording Secretary.

The average annual rate of growth of coniferous trees in the Mt. Rainier reserve, Washington, is said to be 0.0741 of an inch. This was determined by measuring 8000 annual rings.

Two Large White-Oak Trees.

THROUGH the courtesy of Anna M. McAllister, M.D., we are able to present an illustration of the great white oak (*Quercus alba*) growing on what was the "Palmer Homestead," now Graceland Cemetery, in Delaware County, Pennsylvania, just across the Philadelphia City Line. The trunk is irregular in outline, and has a circumference on the ground of 33 feet, the diameters being 9 and 11 feet. Four feet above the ground the circumference is 25 feet, the diameters being 7 feet and 9 feet, depending upon whether the larger or smaller thickness is taken. From the ground to the lowest branch, which has been cut off, is 8 feet. The other branches start about ten feet from the ground. The tree is isolated, symmetrical, perfectly healthy, and promises to attain to larger proportions. A conservative estimate is said to make the age of the tree 500 years, and it is probably older than this.

It is said that the last Council Fire of the Delaware Indians was held under its branches, and arrow-heads have been found around the tree.

The second illustration shows the white-oak tree growing in the Friends' graveyard at Salem, New Jersey. This piece of ground was given to the Society in the year 1681 as a site for a place of worship, and it is probable that this tree was growing there at the date mentioned, or shortly after. In Shourd's "History of Fenwick's Colony," mention is made of this tree, which "has been a large benefactor to the human race, never having turned anyone away who came for protection or shelter from the storms or scorching rays of the noonday sun. The laws which governed this ancient member are unchangeable, always standing upright among men, and not heeding their conflicting opinions; and while the earth, with all its allurements, was kept firmly beneath him, his watchword seemed to be upward and onward with each succeeding year."

There is a tradition that the top of the old tree had been cut out by the British troops during the Revolutionary War, which tradition would seem to be corroborated by the lack of a long upright trunk and the spread of branches.

The tree is 19 feet in circumference 4 feet from the ground, is 85 feet in height, and has a total spread of branches of 117 feet. Some of the lower limbs were removed because they obstructed passage under the tree, but it is still strong and vigorous.

Mr. Jacob M. Lippincott has commemorated this old oak in verse, one stanza of which may be of interest:

"What massive strength thy giant trunk displays!
Lifting its hundred rugged arms on high,
Twisted and curved and crook'd in many ways—
Drooping to earth or pointing to the sky;
O'erarching wide like some vast canopy.
Beneath whose folds, in many a narrow bed,
Ancestral sires and infant offspring lie,
While all thy waving branches overhead
Murmur soft lullabies, or requiems for the dead."

Seventeen-Year Locusts on Mont Alto Reservation.

THE seventeen-year locust, or cicada, is a very interesting insect from an entomological standpoint. It belongs to the order *Hemiptera*, suborder *Homoptera*. The male is remarkable for the sound which it can emit. On each side of the abdomen and under each wing is a membranous drum, worked by powerful muscles, from which the sound comes. To one just coming into a locust-infested country, the sound is almost deafening. It is very shrill, and keeps up continually from about six o'clock in the morning until sundown. The female has a remarkable ovipositum, with which it bores the holes where the eggs are deposited.

No less interesting is the study of the life-habits of the locust and the results of its work. After a very warm day in the early spring of a "locust year," one can see locusts climbing up trees, bushes, fences, anything, in fact, just so they can get off the ground, and to where the sun can strike them. They are not out long until their shells burst on the back and the true locust emerges with wings Their wings must be allowed to become strong, but it takes only a short time, and then they are able to fly about at will. They seem to grow very little after coming from the shell, and apparently live on what nourishment is already within their bodies, for when they are found dead in summer they are entirely hollow. Their life is only about six weeks long, but during that time a female deposits innumerable eggs.

The male does no damage whatever. It is the female, boring holes in the branches of trees and depositing eggs in them, that causes the branches to die. She alights upon the soft, fresh shoot of a tree or shrub, and begins to bore holes on one side of it. As each hole is bored, from ten to twenty eggs are deposited in two ranks. When one hole is completed another is made just above the last one, until they extend to the tip of the branch. Frequently the holes are found on opposite sides of the branch for some distance. A month or so after the stem is stung, it breaks off at the last hole and either drops to the ground at once, or, as is more frequent, hangs to the tree

WHITE OAK. (QUERCUS ALBA, L.).
DELAWARE COUNTY, PENNSYLVANIA.

FOREST LEAVES, VOL. VIII., NO. 12.

WHITE OAK. (QUERCUS ALBA, L.).
SALEM, NEW JERSEY.

INTENTIONAL SECOND EXPOSURE

WHITE OAK. (QUERCUS ALBA, L.).
DELAWARE COUNTY, PENNSYLVANIA.

FOREST LEAVES, VOL. VIII., NO. 12.

WHITE OAK. (QUERCUS ALBA, L.).
SALEM, NEW JERSEY.

for a long time, but finally falls to the ground and is covered. As soon as the egg is hatched, the insect goes into the ground and does not reappear until the seventeenth year.

The extent of damage depends upon the number of locusts in proportion to the amount of the growth in a locality and the condition of such growth. The favorite place of deposit for the eggs is the tender young shoots. On recently burnt areas, where sprouts were plenty this spring, by the middle of summer most of them were killed; if not entirely, at least for eighteen or twenty inches back from the tip, and the leaves looked as though bitten by a heavy frost. In many cases these shoots have broken by this time, and most of those only one or two years old will die. One finds occasionally, however, a sprout which was strong enough to resist the power of what must evidently be poison to the shoot where the eggs are deposited, and which has only a scar showing where the stings were made, the new growth having almost covered the spot. These will not break off, and practically no damage to the growth results. Where the trees were larger, only the new shoots, varying from six to eighteen inches long, were attacked. In many cases not only the side shoots, but also the top shoots were stung. The result of such work is seldom the death of the tree, but only a retarded growth, apparently easily remedied after several years.

In this locality chestnut and chestnut oak are the most common trees. The locusts affect both very much; but its preference above all others seems to be young chestnut. When there are few locusts and many trees, the chestnut is invariably attacked the most. Where the number of locusts increases, more species of trees are affected, and when there are many insects, almost no broad-leaf tree is safe from harm. Next to the chestnut, the chestnut oak seems to attract the locust, and, after it, the other oaks.

Trees that are slightly attacked are red maple, aspen, black gum, locust, ash, sassafras, hickory, and a few of minor importance. The tulip-poplar, in this region, is very seldom stung, only one or two instances being noted. A few which have not been seen to be affected in the least are: sumach, laurel, rhododendron, walnut, the pines, hemlock and cedar.

In passing through the woods after the branches which have been stung have broken and hang downward, with their dead, brown leaves showing against the background of green, one thinks the damage must be incalculable, and yet to forest trees the damage is very slight and quickly remedied, in comparison to the loss sustained in connection with fruit trees, where many blossoms do not mature, which materially lessens the crop.

As yet, there seems to be no effective remedy practicable for use in forests. Hogs and chickens will root and scratch many of the insects from the ground in spring. The English sparrow is known to feed upon them, and no doubt many of the forest birds do also.

GEORGE H. WIRT,
State Forester.

Fall Arbor Day.

DR. NATHAN SCHAEFFER, Superintendent of Public Instruction, appointed Friday, October 17th, as the Fall Arbor Day, and it was quite generally observed, the schools throughout Pennsylvania celebrating the day by appropriate exercises.

At Girard College, Philadelphia, the authorities, when visited by a Committee from the Pennsylvania Forestry Association, expressed much interest in the subject, preparing special circulars,—one containing Arbor Day notes, setting forth briefly the history and purpose of Arbor Day, mentioning some historic trees, and giving the titles of a number of standard works on forestry, while another leaflet was the programme, which consisted of singing, recitations, and a few short remarks. After the exercises in the chapel, an elm tree presented by the Pennsylvania Forestry Association was planted in a conspicuous place on the campus by the senior class. The President of the College proposes to make Arbor Day, hereafter, a special time for tree planting at Girard College.

Its Own Leaves a Natural Food for the Tree.

TO THE EDITOR OF FOREST LEAVES:

Sir—In the October issue of FOREST LEAVES, in the article by J. V. Doniphan, Jr., from the *New York Lumber Trade Journal*, "The Tan-Bark Coppice Forest at Hirschhorn," on the Neckar, near Heidelberg, Germany, there is a statement that has deeply interested the present writer, as follows:

"This operation is the last step in the production of a crop of stool-shoots, and leads over into the beginning of the next rotation, as the fifteen-year period is called, when the first step to be taken is something quite different, and to American eyes very extraordinary. This is nothing more nor less than the planting of grain in the prospective forest, and the harvesting of the same from between

the young shoots. . . . . It is interesting to note that, though the fields in the adjoining country have been so exhausted that large quantities of fertilizing material are necessary to produce a single crop of grain, none is required in the forest land, the leaf litter making the soil sufficiently rich."

Here is a practical demonstration of how and why trees crowded, and for the most part cut off from light and heat about their roots in the forest, flourish, grow, and from the smallest and weakest of beginnings become "the giants" of that "forest." They have had given back to them their own; that natural food which, especially potash, is produced in their leaves. No man is found stupid enough to cart off the leaves of the forest onto the roadside, burn them up, and scatter to the four winds of heaven this valuable plant element. In the orchard or on the lawn of the homestead the trees are doomed to a different treatment from that accorded to their fellow-trees in the forest.

Last fall, on the main line of the Pennsylvania Railroad, the writer was a witness to the destruction on the roadside of those autumn beauties of which it has been said: "My footsteps make music in the withering leaves." More recently, on some well-kept grounds on Nicetown Lane, he has seen great bundles, indeed a cart load, of this precious plant-food collected to be carried off entirely away from the parent trees, while the custodian of the grounds acknowledged that the trees were in bad condition, and that manure was absolutely necessary to save them. A quiet corner in these grounds appropriated to a compost heap, for grass, leaves, etc., to be given back to the trees, would, while producing a good return, give them no more than humane treatment.

It has been clearly demonstrated to the densest rural intellect that to produce crops of wheat, rye, corn, oats, etc., manure, and plenty of it, was absolutely necessary; but even among more enlightened men it has been supposed that a tree planted for five, ten or fifty years in the same spot could live and flourish without such food. Hence the constant decay and thinning out of the once beautiful trees in our own Independence and Washington Squares, where, robbed of their leaves, the trees have received no compensating nourishment.

The late eminent Dr. Geo. B. Wood, by careful and complete experiments on his ancestral home in New Jersey, clearly proved that a peach or other fruit tree, apparently nearly dead, could, with a good supply of potash, continued for two years, be induced to yield a crop of fruit.

More than forty years ago the present writer quoted in a publication two interesting fruit-growing experiences, as follows:

"At a meeting of The Fruit-Growers' Society of Western New York, held in Rochester, September 27, 1859, Mr. W. P. Townsend stated that the old fruit trees in his father's orchard being covered with moss, the effort was made to remove it by scraping, but this was found very laborious and tedious work. In preference to this, he drew in upon these premises an average of half a load of manure to each tree; next year the bark began to peel, and, of course, to bring with it the moss, and the trees increased in vigor. The next summer he turned the hogs into the orchard, and they pretty thoroughly rooted it all over. Even to the tops of the trees the old bark had started, and the body had all the thrifty and vigorous look of young trees. The fruit, which had formerly been from one-half to three-fourths wormy, is now fair, smooth, and free from vermin. By invigorating the trees, the insects disappeared."

"A recent journal gives the plan pursued by Henry Dull, of Pennsylvania, for getting rid of the apple-tree borer. He planted his orchard eighteen years ago, and the trees throve very well until five or six years since, when they began to droop and look sickly. The apple-tree borer was found in great numbers, and had done so much damage that some of the trees appeared to be beyond recovery. He then decided to apply as a manure the urine from the cow stables. This was done most liberally, besides washing the trunks of the trees. 'The result is,' says Mr. Dull, 'I have not a borer in my orchard, and the trees have completely recovered, and give me abundant crops.'"

The lesson here taught is that the tree, equally with the annual plant, needs food. As the leaves have been produced by the tree itself, in giving back to it the constituents of these leaves, it is only giving back its own; and too much emphasis cannot be laid upon the fertilizing needs of the tree, which, in other ways than by that of starvation, we so ruthlessly, stupidly and persistently destroy.

HENRY CAREY BAIRD.

A convention in the interest of the proposed Appalachian National Forest Reserve, under the auspices of the Asheville Board of Trade, the Knoxville Chamber of Commerce, the Newport Board of Trade, and the Directors of the Appalachian National Park Association, was held in Asheville, N. C., on October 25th.

Addresses were made by Rutherford P. Hayes, Col. B. R. Strong, Dr. C. P. Ambler, J. A. Nichols, Hon. J. W. Caldwell, Prof. J. A. Holmes, and suitable resolutions advocating the establishment of National Appalachian Forest Reserves were adopted.

Wood Lots.

THE recent coal-miners' strike has also its bearing upon the forest question. From New England southward, wherever the scarcity of fuel was felt, firewood was brought to market in increased quantity, and in some towns it is said that many people have found that wood is a better and cheaper fuel than coal. Be that as it may, I know one town in Tennessee where wood at $4.00 a cord is the common fuel for cooking, and frequently is used exclusively, though soft coal is brought to them for $2.00 a ton.

Many an owner of a wood lot or piece of brush land has been surprised to find that his property had a value; and again, when he had sold the wood for perhaps seventy-five cents or a dollar a cord, "on the stump," he considered that the five, ten, maybe twenty dollars an acre that it yielded him was clear gain, and a piece of good fortune.

In the common estimation, a wood lot has only a little more value than a cut-over forest; if it forms part of an occupied farm it may yield fencing and firewood; ordinarily it fails to do that, because it is grazed, burned, and maltreated in every way.

The present argument is that the unusual demand for fuel has given a new value to this despised form of property, and though it is highly probable that in most cases the cutting is done with a single eye to present profit, and leaves the woods hacked, torn and unsightly, there are instances in which owners, seeing what can be made out of a well-cared-for wood lot, are attempting to order their cuttings so that the trees shall be reproduced and encouraged to grow at a rapid rate. There are many such instances in Pennsylvania of which it would be highly interesting to have some figures; but, unfortunately, no trustworthy ones are available.

Another feature of the situation deserves more than a passing notice; in fact, it is one in which most of the members of the Forestry Association are interested, and which they can do much to better. I mean the value of tree groups to the landscape. A woods, a piece of timber,—whatever it be called,—is constant refreshment wherever it is found, and the owner rarely objects to its use by the public. These pieces of woods are rarer than they need be, solely because they are abused. Trees in our section grow rapidly, especially those that spring from the stumps of older ones, and a few years suffice to carry the growth from the brush or thicket stage to that of poles, and a close approach to a forest. A young forest has not all the attractions of an old one, but it is cool and fresh and good to look at, and it constantly gets better if simply let alone.

Here, then, is the opportunity. If a woods,—belonging to no matter whom,—is a good thing to a community, let the members of that community help the owner to preserve it.

It is worse than useless to complain of an owner for cutting down his trees, when he has absolutely no encouragement, except the pleasure of his neighbors, maybe, to keep them standing. He pays the taxes on them and runs a constant risk of losing them through somebody's carelessness or malice.

If a thing has a value to me I ought to be willing to pay something for it. Applying this rule to the property of another, what I can pay may take the form of so guarding that other's property that it will be to his advantage to hold it in its present condition. Concretely, the case is this: Woodlands in this country have a low value because they are constantly subject to destruction by fire and by vandals; timber has a steadily increasing worth; hence, but for the risk of loss, any timber owner would save his immature trees at least, and preserve his forest until it should yield another crop. In regard to wood lots, especially those near towns, it is useless to expect the owners to take any particular interest in their preservation so long as the community does nothing but misuse them. Fire is the arch enemy, not so much because the woods are peculiarly susceptible, though that is true too, as because nobody takes the slightest pains to prevent it. Fires in the woods are no more necessary or inevitable than fires in drug stores; care and watchfulness, and only care and watchfulness, will give security to either and make the property of value.

ALFRED GASKILL.

The twenty-fourth annual meeting of the Ontario Agricultural and Experimental Union was held at Guelph, Canada, on December 8th and 9th. Among other features was an illustrated address on "The Evolution of the Forest," by Dr. B. E. Fernow. Also a paper on "The Farmer's Woodlot," by the same gentleman, which was discussed by Mr. Thos. Southworth, and others; and the report of the Committee on Forestry, prepared by Mr. Roland D. Craig.

* * * * *

A common form of fire-line in the pine forests of Germany and Gascony is from 40 to 60 meters wide, which is planted in vineyards, cultivated crops, or some deciduous trees (such as the locust, ailanthus, ash, and maples).

New Hampshire's Forest Fire Law.

THE New Hampshire Forestry Commission has had numerous copies of their forest fire law printed on muslin, in the shape of posters, which are placed in prominent places, and reads as follows :

"If any person shall kindle a fire by the use of firearms, or by any other means, on land not his own, he shall be fined not exceeding ten dollars ; and if such fire spreads and does any damage to the property of others, he shall be fined not exceeding one thousand dollars.

"If any person, for a lawful purpose, shall kindle a fire upon his own land, or upon land which he occupies, or upon which he is laboring, at an unsuitable time, or in a careless and imprudent manner, and shall thereby injure or destroy the property of others, he shall be fined not exceeding one thousand dollars.

"Whoever shall inform the prosecuting officers of the State of evidence which secures the conviction of any person who wilfully, maliciously, or through criminal carelessness has caused any damage by fire in any forest, wood lot, pasture, or field, shall receive from the State a reward of one hundred dollars. The State Treasurer shall pay the same to the informer upon presentation of a certificate of the Attorney-General or Solicitor that he is entitled thereto."

A Suggestion.

TO THE EDITOR OF FOREST LEAVES :

The proposal to collect descriptions of notable trees in or near Philadelphia, referred to in the last (October) number of FOREST LEAVES, is a good one ; but, on the principle that what is worth doing is worth doing well, it is suggested that it would be wise to make an effort to have the reports uniform in essential points. For instance : foresters the world over measure the diameter of all trees at "breast height," and that is taken to be 1.3 meters or 4½ ft. (they are not exactly equivalent). This is, therefore, a good opportunity to accustom some of those who deal with trees to that standard, and, at the same time, to avoid the misleading figures that come from measurements taken on the ground, or where the tree is considerably spread or swollen. Similarly, the form of a tree, its height, spread of branches, etc., are features of importance, and should be properly noted.

There are several interesting booklets descriptive of noble or historical trees in Europe, and there is no doubt that a similar one here would be well received.

The essential points to be noted in each case are the following :

Dimensions : Circumference (always measured at 4½ ft. above the ground) ; total height ; height from ground to first limb ; spread of branches in one or more directions.

Description : The kind of tree—its botanical name, if possible, but always something that will identify it beyond question ; the form of the crown ; the form of the trunk ; the condition of the tree—whether sound, decayed, broken, etc. ; the situation in which the tree stands ; its age, if known.

To these may be added any other pertinent facts. If photographs are also furnished, the whole story will be told, and though FOREST LEAVES may not care to reproduce each one, the record will be valuable.

Respectfully,
ALFRED GASKILL.

Forestry for Farmers.

THE farmers of this country own about 500,000,000 acres of woodland, nine times the acreage of all the Federal forest reserves. Most of it consists of small wood lots from which the owners derive their timber supplies for farm purposes.

It was to help the farmer in caring for his timber land that the Bureau of Forestry several years ago undertook to furnish him, without cost, with the services of its foresters. The offer proved popular, and applications for assistance have far exceeded the ability of the Bureau, with its limited number of trained foresters, to answer them. During the season just passed more has been accomplished than ever before in putting small wood lots under forest management and in teaching the farmer how properly to treat his timber. Two experts have been employed in the North and South who have examined and have put under management several thousand acres of woodland.

A great deal of wood is consumed every year on the farm for fuel, posts, poles, and other uses. Ordinarily, the farmer cuts what he needs without thought as to whether he is lessening the power of his forest constantly to yield its supplies. The result is that the forest becomes poorer every year and less able to furnish the wood its owner needs. The skill the farmer exercises in the management of his crops is not of the kind that enables him to manage properly his timber. He needs the services of a forester.

Usually, only one visit to the farm by the Bureau's expert is necessary, and this service is given without cost to the owner. When, as occasionally happens, a second visit is needed, the owner is required to pay the traveling and living expenses of the expert while employed at the work.

Obituary.

ON Saturday, October 11th, Mr. Howard M. Jenkins, Vice-President of the Pennsylvania Forestry Association, met his death by an accident at Buck Hill Falls, Pa.

Mr. Jenkins had been showing a friend the beauties of the falls, and, in order to cross the stream above the falls (the usual bridge having been carried away by the swollen waters), threw a plank over the creek, just above the chasm. Mr. Jenkins went to the other side, but on his return, either the plank tilted or he lost his balance, fell off the plank, and was carried over the falls, his body being recovered about 45 minutes later from the second pool.

Mr. Jenkins was born in 1842, being in his 61st year, was a leader of the Society of Friends, editor-in-chief the *Friends' Intelligencer*, a fluent and graceful writer, and also an authority on colonial and revolutionary history. His untimely death will be regretted in the philanthropic, journalistic, literary and social spheres in which he was known and respected.

At the Council meeting of the Pennsylvania Forestry Association, the following record was ordered spread on the minutes :

"The Council of the Pennsylvania Forestry Association, appreciating the services which the late Howard M. Jenkins rendered to the Association and to the community in which he lived, places on record this minute as a feeble expression of the personal sorrow felt by each member that an honored colleague and an esteemed friend has been called from us by death.

"The sterling integrity and purity of motive which controlled every action of the late Howard M. Jenkins permits us as friends to share with his family the sorrow born of affection. His devotion to the cause of forestry resulted naturally from the interest which he exhibited in the welfare of his native State and country, as well as in all that benefited his fellowman. True to his God, his country, his family and his friends, he was always on the side of justice to his fellows, and ready to participate in any movement calculated to improve the present or provide for the future well-being of all mankind. As a leader of thought, his editorial work has been good seed sown, which will mature and by its fruit be a fit memorial of the writer.

"With membership in the Pennsylvania Forestry Association dating from 1889, he served as Vice-President for ten years, winning the esteem and affection of those with whom he was associated by his wise counsel and lovable nature.

"In offering heartfelt sympathy to the bereaved family of our deceased colleague, the Council feels that it can but imperfectly give expression to the loss which it feels as a body, and the personal sorrow which has come to each of its members."

New Publications.

A First Book of Forestry. By Filibert Roth, Chief of Division of Forestry, Department of the Interior, U. S. Washington, D. C. Pp. 291. Figs. 98. Ginn & Co., Boston, Mass.

This is a thoroughly well conceived and written book. The author from the start and throughout had a clearly defined plan in view. The consequence is that there is no really important phase of forestry upon which there is not a reliable utterance. It may be brief, as becomes a first book, but it is authoritative.

The style is singularly simple, yet scholarly, for there is no ambiguity. Each sentence is clearly cut and crisp. This book is eminently fitted for use as "a reader" in our public schools. It is quite safe to say that if it were generally adopted as such over the land, that the next generation would take a long step in forestry education, and the country would be much better prepared for the necessary, inevitable work of reforesting its extensive waste areas.

The illustrations are as well selected as the text. One is surprised at the vast range from which Mr. Roth has drawn the contents of this book. It can hardly be said to be more applicable to one portion of the country than to another, but is certainly well suited to all.

American forestry has passed the amateur stage, and entered upon the professional. The books of Pinchot, Sargent, Graves, Fernow, Green, Gifford and Roth are now available, and anyone desiring to understand true forestry can do so by a study of their writings. J. T. R.

Message from the President of the United States Transmitting Report of the Secretary of Agriculture in Relation to the Forests, Rivers and Mountains of the Southern Appalachian Region. 210 pages, large 8vo., bound in cloth. Illustrated. Government Printing Office, Washington, D. C.

This book contains the text of President Roosevelt's letter to Congress, transmitting with it the Report of the Secretary of Agriculture in regard to the Southern Appalachian Region, in which both the President and the Secretary recommend

the establishment in that district of a National Forest Reserve. The Report of the Secretary of Agriculture sets forth in no uncertain language the need of the Appalachian Forest Reserve, which has already been mentioned in FOREST LEAVES, and is accompanied by a number of reports taking up the various subjects, thus: "Forests and Forestry Conditions in the Southern Appalachians," "Trees in the Southern Appalachians," and "Description of the Southern Appalachian Forest by River Basins," are treated by H. B. Ayres and W. W. Ashe; "Lumbering in the Southern Appalachians," by O. W. Price; while W. W. Ashe contributes a "List of Shrubs in the Southern Appalachians." Arthur Keith treats of the topography and geology of the region, H. A. Pressey and E. W. Myers the hydrography, and Alfred J. Henry of the climate, while the final Appendix gives a *résumé* of the status of the movement for a National park. memorials and resolutions favoring it, extracts from the press, etc. These various reports show most conclusively the need of a National Forest Reserve in the Southern Appalachian Mountains in order to preserve the forests on the highest and most abundantly watered region in the eastern section of the United States, thus regulating the flow of water, preventing floods, and preserving both agricultural and manufacturing interests. The effects of the disastrous floods are well illustrated, and the magnificent forests and mountains of this region, shown in the 78 plates which accompany the report.

Annual Report of the Smithsonian Institution, 1901. 8vo, pp. 782. Illustrated. Government Printing Office, Washington, D. C.

It contains fifty articles, many of them illustrated, telling in clear and interesting language of the latest progress in all the principal branches of knowledge.

A short sketch of the history and the work of the Smithsonian Institution begins with a paragraph from President Roosevelt's first message to Congress, in which he calls attention to the Institution's functions and its present needs.

"Bodies Smaller than Atoms" is the title of an interesting paper, and as we read "The Laws of Nature," "The Greatest Flying Creature," and "The Fire Walk Ceremony at Tahiti," we are reminded of the wide range of subjects included in the Report. Wireless telegraphy, transatlantic telephoning and the telephonograph are discussed by experts in electrical progress. Attention ought also to be called to papers on utilization of the sun's energy, the Bogosloff volcanoes of Alaska, forest destruction, irrigation, the Children's Room at the Smithsonian, the submarine boat, a new African animal, pictures by prehistoric cave-dwellers in France, automobile races, the terrible lizards that once lived in America, and Mr. Thompson Seton's paper on the National Zoölogical Park at Washington.

The Hardy Catalpa. Bulletin 37. Bureau of Forestry, U. S. Department of Agriculture, Washington, D. C. 8vo, 60 pages. Illustrated.

This Bulletin is divided into two parts, the first entitled "The Hardy Catalpa in Commercial Plantations," by Wm. L. Hall, Superintendent of Tree Planting, and the second, "The Diseases of the Hardy Catalpa," by Dr. Hermann von Schrenk, Pathologist in charge of the Mississippi Valley Laboratory of the Bureau of Plant Industry. Mr. Hall gives the results of his investigations in the largest planted forests of hardy catalpa in this country. The plantations described are the Munger, the Farlington, Hunnewell and Yaggy plantations, all located in the State of Kansas. The Munger forest of 145 acres was started in 1887. The cost, including the cost of trees, planting, cultivation, rent of land, and estimated cost of marketing is $56.96 per acre, and after allowing for interest on investment it is claimed there is a present profit of $167.01 per acre. The Farlington forest, commenced in 1877, now owned by the St. Louis and San Francisco R. R., contains 400 acres of catalpa. The net cost per acre, as in the previous instance, including interest, is $252.02, the gross value $390.21 per acre, leaving a clear profit of $138.19. The Hunnewell plantation of 400 acres was begun in 1880, and the profit is estimated at $176.87 per acre. On the Yaggy plantation, comprising 421 acres, planting was started in 1890, the average annual return varying from $7.25 to $21.55 per acre. Tables are given showing the rate of growth, etc., important cultural points are discussed, and all the various phases of the industry set forth. The catalpa tree, as a rule, is free from insects, but Dr. von Schrenk describes the principal fungus enemy of the tree as soft rot (*Polyporus versicolor* L.), although occasionally "brown rot" and a blight attack the trees. Methods of prevention and remedies are given.

Proceedings of the Second Convention of Weather Bureau Officials. Weather Bureau, U. S. Department of Agriculture, Washington, D. C. 8vo, 246 pages. Illustrated.

This Bulletin (No. 31) gives an interesting account of the meeting of the Weather Bureau Officials in Milwaukee, Wis., Aug. 27–29, 1901, with the text of the valuable meteorological papers presented.

F. R. MEIER,

Consulting Forester,

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